ILLINOIS MEDICAL JOURNAL

THE OFFICIAL ORGAN OF

THE ILLINOIS STATE MEDICAL SOCIETY

VOL. 71 OAK PARK, ILL., JANUARY, 1937 NO. 1

ILLINOIS MEDICAL JOURNAL

Published monthly by the Illinois State Medical Society under the direction of the Publication Committee of the Council.

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Membership correspondence to Dr. Harold M. Camp, Monmouth, Ill.

Society proceedings and news items and changes in the mailing list to Dr. Henry G. Ohls, Managing Editor, 1618 Juneway Terrace, Chicago.

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Editorials

HAPPY NEW YEAR!

The phrase is as old as the calendar and as trite as trouble, yet through the centuries the recurrence of its utterance has been a spark to kindle anew in the hearts of men, the fires of hope!

Hope, illusory though it may prove, is one of the major factors of life. To the medical profession hope is a fundamental asset. Early in our years of service we learn that we must keep up the *hope* of the patient, the *hope* of his family and of his friends, and last but not least, our own faith in the ultimate betterance of what is bad and the further development of what is good. In our more mature and in our later years, this fundamental essence of *hope* inevitably proves to be one of the most precious compounds in any dispensary.

Which is why, to the medical man, this annual message of "Happy New Year" means a great deal more than gold embossed letters and a red and white greeting card. To doctors this phrase signifies a renewal of faith in the minds and the methods of men. To the doctor at large the phrase is a reminder that what is before us *must* be better than that which has been left behind. The Fifth Verse of the 146th Psalm cites those "Whose hope is in the Lord." The doctor must have not only faith in the Lord, but in himself and in all things mundane.

We believe firmly that this will be a "Happy New Year" for the medical profession, and the foundation for this belief is the indubitable awakening of the profession to the fact that doctors can not live by science and service alone but that due respect for the *economics* of the profession is a necessary fundamental. This awakening, this realization of the tricks that have been played by a misguided public upon the profession is that conception of an existing situation for which these editorial columns have besought its readers for several decades. That this understanding is coming about, slowly but surely, is

basis for knowledge that the coming twelvemonth will make for greater felicity in the ranks of the profession.

It is cheering to know that the profession has turned the x-ray upon all such invidious forms of socialism as "State" medicine, whether it be masked as "health insurance" or by some other mocking masque. Thus informed there is no doubt but that no matter from what Parnassian heights these false and radical doctrines may be cast like Jovian thunderbolts to destroy all that is best in Medicine, and all that is best in Americanism, the profession is perfectly capable and perfectly determined to set up enough lightning-rods to deflect these socialist instruments of chaos.

So for those ideals of medicine that keep in the heart of the profession the ideals, rather than the illusions of hope, let it be written again,

"A Happy New Year."

ANTI-SYPHILIS CRUSADE SPURTS INTO YEAR END ACTIVITY

As we go to press, lay newspapers and journals all over the land, are filled with the doings of the first session of the three-day conference "to open a nation wide war against the dread twin scourges of syphilis and gonorrhea" as the *Chicago Tribune* (Monday, Dec. 28, 1936) phrases the movement.

The conference, called by Surgeon General of the United States Public Health Service, is said in these same press dispatches to draw its delegates from "noted gynecologists, *health experts and social service leaders.*"

It is to be noted that *family physicians were not thought worthy of mention*—even if any of that busy group were able to find time to attend. As in smallpox, tuberculosis, typhus or typhoid fevers, scarlet fever, or cholera, in questions of community prophylaxis, the public health service, whether municipal or national can be of utmost assistance to *medical control of the plague.*

According to a statement attributed to The Surgeon General of The Public Health Service the purpose of the conference is to "encourage discussion of the venereal disease problem in open forum" and that "already medical, *nursing, lay and church groups have subscribed to the fight.*"

Venereal disease is one of the tragic problems of any nation. Ravages of such affliction "even to the fourth generation," is one of the greatest of physical calamities met with in medical practice. Dr. William F. Snow, general director of the American Hygiene Association, had prepared a set of figures for "the conference" in which he stated that "about 6,000,000 men, women and children in the United States are infected with syphilis. Yet not one in ten of this number is under treatment by a licensed physician. The amount of gonorrhea is twice as great. At least 26,000 persons die in this country every year from syphilis."

Further figures presented were that the incidence of syphilis is two to one as compared to tuberculosis and 100 to one as compared to infantile paralysis and that it is estimated cases of syphilis and gonorrhea during 1936 in the United States totalled 19,000,000.

Mexico has also spurted up on its fight against syphilis. Six years ago the League of Nations found Mexico the third highest in infant mortality—always a disputable figure since Mexican records are so laxly kept it might as well rank first.

Authorities claim that the infant mortality in Mexico account for something like 23% of the total death rate. Dr. Salvador Gonzalez Herrejon, medical savant of Mexico, asserts that 14% of the entire population is suffering from venereal disease and that in Mexico City itself at least 50% of the population is thus afflicted!

At the recent "Congress against Crime" held in Mexico City the point was raised that "transmission of venereal disease shall be considered a crime." So far this point has not yet become either a Mexican law or statute.

Mexico admits failure to regulate prostitution or to control venereal disease by licensing or protecting prostitution. Oddly enough the Mexican and the United States anti-venereal campaigns seem to have sprung into fresh growth at about the same time. The question is, since the law has failed to stop prostitution, as it failed to check inebriety and as it fails to stamp out gambling, how far will any law be effective against venereal disease? This would appear to be a medical problem.

The effect of a little knowledge about that sort of thing when distributed to the general public may be gleaned by perusing this excerpt from the able column maintained daily in *The Chi-*

cago Tribune and edited by Dr. Irving S. Cutter under the title "How to Keep Well." This clipping is taken from Dr. Cutter's column in the edition of Monday, December 28, 1936, and reads:

NOT DANGEROUS

"G. W. writes: Will you settle an argument that comes up frequently in my family and perhaps avoid a tragedy? Unfortunately, some years ago I contracted syphilis. After considerable treatment I became negative and have had Wassermann and Kahn tests every six months since. I even had a spinal test which was also negative. I have a boy 21 years old and he does not bathe, eat, or shave at home on account of my having had the disease. He has had four blood tests taken, all of which were negative. I claim there is no danger to any member of my family, at this stage, but my son thinks otherwise.

REPLY

"You have long since passed the infective stage and since you are wise enough to hold yourself under medical observation, there is no possible way in which you can be dangerous to others. The numerous negative tests are proof positive."

PROPAGANDA FOR COMPULSORY HEALTH INSURANCE IS BOTH ELUCIDATIVE AND ALARMING

An insight into methods of "build-up" to incite a so-called "popular demand" for health insurance is revealed by a recent poignant editorial in *The New York Medical Week.*

At the request of the Public Relations Bureau of The Medical Society of the State of New York this editorial is herewith reprinted. Entitled "Health Insurance Propaganda," its comparative citations of recent "loaded" comment favorable to this communistic, un-American measure are both elucidative and alarming.

The long-suffering American people has been subjected to much forcible feeding of socialistic propaganda. Of all such messes offered this of "health insurance" that brings no *health* in its wake, and of an insurance that does not insure, is by far the most nauseous. It not only behooves every ethical physician to study the facts set forth but to spread their indubitable truth as far as lies within his personal powers.

There are clever brains behind this cooked-up communistic pottage that is being prepared for the American people in lieu of their birthright of scientific care. The misfortune is that while cleverness and wisdom may seem to be slightly akin in reality they are as far apart as the poles themselves.

Read every line, doctor, of this editorial headed "Health Insurance Propaganda."

HEALTH INSURANCE PROPAGANDA

On Monday, November 23, 1936, a newspaper of the city, the *New York Herald Tribune,* gave its columns over to a piece of propaganda which deserves attention. Under date of November 22, 1936, and presumably coming from Washington, a feature article is written, headed "Health Insurance Study Is Instituted by Security Board."

Like all propaganda, the "news-spread" necessarily must be tacked to some event and so this time we find it tacked to some casual recommendations made by Harry Hopkins, WPA Administrator, in a speech to the United States Conference of Mayors last Tuesday; and incidentally also it is tacked to a report of the Executive Counsel of the American Federation of Labor. Then, not giving either the speech made by Mr. Hopkins or the substance of the report of the Executive Counsel of the American Federation of Labor, the propagandist in question hides his identity under the statement, "A spokesman for the Social Security Board." For the rest of a column and a half of ordinary newspaper space there is nothing but argument and propaganda, and little or no factual news. In the end the reader is left to wonder *who* is advocating health insurance, who is putting forth the arguments for it, who says that it is to be considered purely as a tax measure, and who is it that is forcing attention to it and arousing argument.

The stress presented in the newspaper broadcast consists primarily in the fact that existing systems of unemployment compensation and old age benefits "are generally believed in Security Board circles as measures to bring health insurance to the fore" and "almost all European countries have comprehensive plans of health insurance providing cash benefits in disability and invalidity and supplying medical aid." The plea ends with the statement that it can be conducted on a pay-as-you-go plan.

In the September 1st issue of the *New York State Journal of Medicine* editorial note was made of the "lull before the storm." An ominous silence was noticed on the part of the protagonists for health insurance. We were then aware that the protagonists of health insurane had not quit. We rather resent the fact, however, that *government agencies* should engage in propaganda *to create a demand for something which the public has neither asked for nor needs.*

The news release also announces that more time to study the proposition is asked. We seriously recommend that it be studied; that comparison be made of

the morbidity and mortality statistics abroad with those here; that the uses which are made of preventive medicine abroad with that here be taken into account. We could go on at length but of what avail to argue with those whose minds are made up. What can one expect from Walton Hale Hamilton, the economist head of the research division, a former member of the National Industrial Recovery Board! We know him through a different activity. He was one of those who, under Ray Lyman Wilbur, brought out the report of the Committee on the Costs of Medical Care which recommended health insurance; and he wrote his own special report on this thesis, which in itself was but an elucidation of the preconceived object of the committee, from the pen of its director, Harry H. Moore.

President Roosevelt has announced that there will be no measures proposed calling for the necessity of adding to our present heavy tax burden. Furthermore the President, in his address in Jersey City, gave the profession assurances that it would be consulted, and its wishes given attention when changes affecting medical practice came under consideration. Our conception of consultation and consideration does not envisage government spokesmen speaking for their preconceived ideas, long fixed, of how medical practice shall be arranged.

It has been jocularly said that the many governmental functionaries who speak publicly for the administration have so managed things that the Washington administration can take more sides on any given question than is possible of geometrical demonstration. In this question of medical care, at least, let us have plain, straight thinking and speaking. There should be but one side to the problem. How to provide the highest possible *quality* of medical care to those of the public that need it, and to make provision that financial barriers shall not stop those needing it from getting it.

A NEW LIGHT ON HEALTH INSURANCE AGITATION

Some six or seven weeks ago one of the greatest of the world's newspapers (*The New York Herald-Tribune*) printed a news dispatch from Washington, D. C., that had all the earmarks of a hit-below-the-belt at the medical profession.

As doughtily as if they were their own ancestors out chasing Hessian troops, members of the New York Medical Society, headed by their president, the fearless Floyd S. Winslow, took up the fight. When the history of this decade of medical economics is written, the three documents we reprint herewith will be, quite beyond argument, instruments of importance.

Their very significance earns them space here. In order these are

1. Washington dispatch by Albert L. Warner, "Health Insurance Study Is Initiated by Security Board," printed under date of November 23, 1936.

2. Letter entitled "Compulsory Sickness Insurance," written by Floyd S. Winslow, Rochester, N. Y., president Medical Society of the State of New York, and printed on editorial page of *New York Herald-Tribune* under date of November 24, 1936.

3. Editorial, "Nationalized Medicine," in *New York Herald-Tribune* under date of December 1, 1936.

These reprints will all bear the closest scrutiny.

HEALTH INSURANCE STUDY IS INITIATED BY SECURITY BOARD

EXPERTS DIRECTED TO LEARN COST OF MEDICAL SERVICE AND CASH FOR TIME LOST OFF JOB THROUGH ILLNESS

TAXES SEEN AS ONLY FINANCING METHOD

ROOSEVELT PROMISE OF NO NEW LEVIES MAY FORCE DELAY OF PLAN FOR YEAR, EVEN IF IT IS APPROVED

By Albert L. Warner

Washington, Nov. 22.—The Social Security Board has initiated a study looking to possible proposal of a major addition to the social security system in the shape of health insurance, it was disclosed today.

As large a Federal project for social welfare as either unemployment insurance or the old-age benefit insurance system, health insurance would provide both medical services and cash payments in partial compensation of wage losses due to illness. Should legislation for this purpose be sponsored, it would probably be of the same universal type as the old-age benefits. The coverage would extend to most of the working population of the nation and taxes would be required to finance it.

EARLY PROPOSAL DELAYED

An official proposal considered two years ago, but postponed, contemplated establishment by the Federal government of minimum standards for health insurance practice and provision of grants or other incentives to states undertaking the development of systems meeting the Federal standards. The fact is cited that nearly every large industrial country of the world has applied the principle of insurance to the risks of illness.

The new study is in line with recommendations made by Harry Hopkins, WPA Administrator, in a speech to the United States Conference of Mayors last Tuesday and the report of the executive council of the American Federation of Labor.

A spokesman for the Social Security Board said that the board had drawn no bill on the subject and had

made no commitment as to sponsoring the new line of insurance. Invoking the authority of Section 702 of the social security act, however, the board has directed that a research study of the subject be made and experts are starting work in this connection, it was stated. In view of the promise of President Roosevelt to avoid new taxes at the coming session of Congress, it is possible the Social Security Board might temporarily withhold pressing the health insurance proposal even if it should decide to recommend favorable action on the basis of the projected studies.

Cost Estimate Is High

Comprehensive health insurance has been estimated as likely to cost the equivalent of more than 5 per cent of pay rolls. The Presdent's committee on economic security in January, 1935, prepared a tentative plan, but recommended further studies. It found that the cost of wage-loss payments would be 1 to 1¼ per cent of pay roll. It estimated that families with up to $3,000 earnings a year are spending 4½ per cent now of their income for medical care. Under existing social security legislation the unemployment insurance tax will run to 3 per cent of pay rolls, payable by the employer, and the old age benefits will cost 6 per cent, shared equally by employers and employees. State and Federal money, however, is already being raised and spent for a certain amount of medical care which would be covered in the service offered by health insurance. It is held improbable that any recommendation would contemplate raising all the cost of health insurance from pay roll taxes.

The Security Board's study will be under the general direction of Walton Hale Hamilton, economical head of the research division and former member of the National Industrial Recovery Board. The authorization in Section 702 directs the board to study and recommend "the most effective methods of providing economic security through social insurance and as to legislation and matters of administrative policy concerning old-age pensions, unemployment compensation, accident compensation and related subjects."

Existing systems of unemployment compensation and old-age benefits are generally believed in Security Board circles as sure to bring health insurance to the fore. The present unemployment compensation scheme compensates unemployment due to lack of work, but does not compensate unemployment due to inability of wageearner to work because of illness. In practice it is anticipated that it may be quite difficult to draw the line between these two types of unemployment, and that the present scheme will tend to compensate wageearners for disability under the guise of unemployment.

Similarly, the old age benefit plan will bring up the question of what is to be done for the worker who, before reaching the age of sixty-five becomes permanently disabled, it is pointed out. Under the present plan a worker at forty-five who became permanently disabled would receive no benefits until he became eligible for old age benefits at sixty-five.

Almost all European countries have comprehensive plans of health insurance providing cash benefits in disability and invalidity and supplying medical aid. The cost of these plans is usually shared by three parties: the employer, the employee and the state.

Unlike unemployment compensation and old age benefits, health insurance requires the building up of no large reserve, officials say. The plan can be placed on a pay-as-you-go basis, each year's cost being met out of that year's receipts. Also, unlike the other two insurance plans already established, the insured worker under health insurance gets benefits from the start. He does not have to wait until the next depression or until he reaches old age. Accordingly, it is believed there is less difficulty in the collection of the taxes or contributions than in these other forms of insurance.

COMPULSORY SICKNESS INSURANCE

To the New York Herald Tribune:

As president of the Medical Society of the State of New York, please permit me to comment on the item appearing on the front page of your issue of November 23, under the headline: "Health Insurance Study Is Initiated by Security Board."

The article describes the European scheme of so-called "health insurance" better called "sickness tax." The writer, Albert L. Warner, presents a typical case for collectivist medicine, bureaucratically controlled, which the medical profession, almost as a unit, opposes for the reason that in every country where it has been tried it has resulted in a deterioration of the quality of medical care which the public receives.

* * *

Your correspondent states: "Almost all European countries have comprehensive plans of health insurance providing cash benefits in disability and invalidity and supplying medical aid. The cost of these plans is usually shared by three parties: the employer, the employee and the state."

This is a correct statement. But the public should know that in these countries the economic status of the industrial worker, before sickness insurance legislation, was so low that he could barely gain enough food for himself and his family, to say nothing of providing medical care. In England, a radio or a car is beyond the dreams of the industrial worker. Bismarck in Germany and Lloyd George in England, put forth this scheme as a sop to socialism, and its result has been to fasten a gigantic pay roll of stenographers, clerks, "economic advisers" and what not on the backs of the laboring people, in exchange for a type of medical care which has been described as "a pat on the back, a stock prescription, and out the door."

What do well informed Europeans say about compulsory sickness insurance?

* * *

Sir Frederick Treves says: "The English working class has a craving for bottles of medicine which is second to the craving for strong drink."

Many physicians are required to see forty to sixty patients a day—some average 100. This is far too many. Why do not British doctors complain? It should be remembered that health insurance has existed as a

part of the government in England since 1911. British physicians who see its great defects are "cagey" in their public statements derogatory of a system on which so many physicians and bureaucrats are dependent. Yet Sir E. Farquhar Buzzard, in his presidential address before the British Medical Association, said: "Any medical service which aims at the prevention and early detection of disease, to say nothing of the preservation of health, must provide the doctor with ample time to carry out his work, and I have no hesitation in adding the better educated the doctor the more time he will require.

* * *

"The chief flaw in a badly organized service, such as that which has evolved in this country during the last century, is lack of time, and both the general practitioner and the consultant, in order to earn a living wage, are frequently obliged to undertake far more work than they can deal with efficiently in the hours at their disposal."

Regarding the system in Austria, I quote Dr. Jacob L. Moreno, director of research, New York Training School for Girls, Hudson, N. Y.:

"No physician is capable of properly treating the large number of patients sent him under sickness insurance. He is forced to evolve some mass production plan of operating his office to run people through his mill as fast as possible. The 'rush' system of handling patients is inevitable. When the technique of getting them in and out fast is perfected, the doctor begins to lose that intangible 'something' which is vital to both himself and his patients—his morale. I do not know any doctor who remained long at this sort of practice in Austria who did not become hardened."

Regarding Germany, Dr. Paul G. Frank, a German physician at present in this country, says: "For almost thirty years I have worked as a German panel doctor under the conditions of compulsory health insurance. and for many years I was a member of the physicians' committee. During this period I witnessed a deterioration of the medical profession. It came about by the removal of the sanctions of preferment by skill and the substitution of preferment by convenience.

* * *

"What I mean is that an insurance scheme soon becomes a business—it must do so to succeed, while the practice of medicine must be a profession to succeed at its best, and the two will not mix. In Germany the physician who was most adaptable to the advancement of the plans of the insurance officials, and who most pleased the patient for reasons perhaps quite other than skill, obtained the most rapid preferment."

Some of the most high-minded and altruistic of American physicians deplore the propaganda being disseminated in behalf of this unworkable system. William J. Mayo says: "We of the medical profession are determined that we will not be subjected to political interference. We will not sacrifice the spiritual values of our profession for the small material gains held out to us by political and social experimenters who are attempting now to control the practice of medicine. We refuse to be dictated to by men who are not physicians, who do not understand the sacred obligation of physicians to their patients."

* * *

Security for the doctor means insecurity for the patient. Advocates of these measures lure the profession with the siren song of bureaucratic jobs, assured income—security—false security. We do not want to be secure. We want to remain insecure. We prefer the discipline of private practice which keeps us on our toes to an assured income under bureaucratic control where our highest ambition is more likely to be to keep ourselves solid with the politicians who have taken over the job of running our profession.

The physicians of the country would approve such a widespread plan for medical care if there were a reasonable hope, based on experience, that it would work. As a profession, our first interest is the interest of the patient. It is needless for me to say that in our daily work it is our constant effort, to render our services unnecessary—we are a group of men constantly trying to work ourselves out of employment. If sickness insurance were anything better than a palliative to "kid" the people into thinking they are getting something for nothing, the medical profession would be the first to support it. If there were, in fact, any worthy evidence that the health of the people had been improved in any country adopting this scheme, we would be willing at least to try it in America.

* * *

What is the evidence on this point?

The health section of the League of Nations has compiled statistics on the general death rate of all reporting countries, covering the period from 1911 to 1934. Six countries, in 1934, had a death rate from all causes of less than ten a thousand. Think about that for a minute, and what it means! A very fine record, is it not? These countries were the Union of South Africa, Australia, Canada, New Zealand, Norway and the Netherlands. Four of these six, the Union of South Africa, Australia, Canada and New Zealand, do not have compulsory health insurance!

According to these same League of Nations statistics, our death rate in 1934 stood at eleven a thousand; right behind the leaders. You must remember that this includes the Southern states, with a Negro population not found in any European country. If you leave out these Southern states and consider only that part of our country in comparable geographic location to the European countries with compulsory health-insurance systems, we would have a lower death rate than that of any insured country!

* * *

Nearer home are other countries whose vital statistics are on file with the League of Nations. One South American country—Chile—has compulsory insurance. Its death rate in 1934 was 26.8. Compare this with the rate of 11.8 in Argentina and 10 in Uruguay, neither of which countries has an insurance system!

Are the American people to be misled by social theorists into saddling themselves with a system that

works like this? I am sure they will not if they are informed of such facts as are submitted here.

Floyd S. Winslow, M. D.,
President Medical Society of the State of New York.
Rochester, N. Y., Nov. 23, 1936.

NATIONALIZED MEDICINE

The Social Security Board let it be known in Washington a few days ago that it had authorized a study of health insurance on a nation-wide scale as a corollary to unemployment insurance. The board has made no commitment in favor of a Federal system of health insurance and has yet to consider what form such legislation might take.

The letter which appeared on this page recently from Dr. Floyd S. Winslow, president of the New York State Medical Society, opposing warmly such a system heralds a storm of criticism which will burst upon Washington if legislative support of such a program is ever sought. For, with rare exceptions, every medical association or society, national, state or county, in the United States, continues to be uncompromisingly hostile to "socialized medicine."

Yet certain conditions exist in this country which argue for a much wider distribution of medical services than now exists. In some quarters they seem to argue for heavier subsidies from public funds for public heath work. Most of these conditions and needs are, we believe, recognized by organized medicine. In rough outline they are as follows: There is a big element in the population either needy, ignorant and reckless of health or with low earning power but a real pride that gets much less medical attention than it should. Aside from all humanitarian considerations, this is a matter for grave public concern. Those persons disabled by neglected injuries or illnesses are likely to become permanent and expensive burdens on private charity or public funds. They also incubate sickness to the detriment of the public health. Next, there are more well trained and competent doctors and nurses in the United States than can earn a faiir return on their investments in education and training. This makes the cost of medical attention to those of average income, who want medical care and want to pay for it, discouragingly high.

Faced with these conditions, all those persons who would rather have the government take any difficult problem off their minds and solve it expensively and inefficiently than think and work it out for themselves clamor at once for compulsory health insurance under Federal control. Accepting such propaganda as a challenge, the medical organizations become so bitterly (if justly) critical of every compulsory insurance scheme —and are so much on the defensive—that they appear in their publications to be taking a let-well-enough-alone attitude. Against "socialized medicine" in every form that has been tried abroad, they argue from abundant data that it constitutes an enormous tax burden, that it lowers the quality of medical care for all, that it does not improve public health and that it forfeits through perfunctory, impersonal treatment the confidence of those very elements in the population which it is designed to benefit.

These objections, when examined in detail, are enough to line up the average conservative American layman behind the medical profession in its hostility to compulsory insurance. But mere hostility is not enough. The gap in medical care must be studied and a sound remedy devised. Otherwise the "socializer," who has the bit in his teeth, will prevail. To save the medical profession and the nation from the affliction of another European institution, about as well suited to our temper as peace-time conscription, it seems to us that the doctors will have to consider forthwith how medical, nursing and hospital service can be rapidly extended in conformity with the public interest and with their professional ideals.

OPERATIVE TREATMENT OF STERILITY IN THE MALE

Francis R. Hagner, Washington, D. C. (Journal A. M. A., Dec. 5, 1936), believes that the most frequent cause of sterility in the male is inflammatory occlusion of the epididymis or vas deferens and limits his remarks to its treatment. The endeavor to overcome the occlusion by an anastomosis of the vas deferens and the globus major offers the only chance of recovery. The author has never had a successful case following operation for sterility in which the patient has not had a history of bilateral epididymitis. There are two conditions that must be present for a successful result in sterility of this type: first, the vas must be patulous above the point of the anastomosis; second, the globus major, or the upper portion of the body of the epididymis, must contain live spermatozoa. A failure at one time, if live spermatozoa are present and if the vas is patulous, is not a contraindication to a second operation. In some of his most successful results he has had a failure the first time, with a favorable outcome at the second operation. The time of the appearance of the spermatozoa varies. Reoperation is not recommended before a year has passed. Nearly all the author's operations have been done by lateral anastomosis, except for a few rather atypical ones, and success has been obtained only in those cases in which silver wire was used as a suture. The operation, while tedious, is not dangerous to life. General anesthesia should be used. In order to avoid the formation of scar tissue no local infiltration should be used. The operation cannot compromise the function of an organ that has already proved functionless.

ARGUMENT FOR HEALTH INSURANCE

The Inside Dope

Foreman (to small son of workman who has met with an accident)—When will your dad be fit for work again?

Boy—Can't say for certain, but it won't be for a long time.

Foreman—What makes you think that?

Boy—'Cause compensation's set in.—Montreal Star.

MEDICAL ECONOMICS

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Ralph Peairs, M. D.
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Edited by the Committee on Medical Economics
of the
Illinois State Medical Society
E. S. Hamilton M. D., Chairman
Kankakee, Illinois
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Every man is most interested in that phase of his work which particularly appeals to him. This is especially true of medical men. Those of us, who have given special thought to the broad subject of medical economics, are greatly heartened by the attention being given this subject all over the country. The recent statement of Dr. Thomas Parran, Surgeon General of the United States Health Service, voicing his opposition to Compulsory Health Insurance was most pleasing. Coming at a time when he is endeavoring to interest the medical men of the United States in the battle for the control of syphilis, it shows that he appreciated the source of the support necessary to carry this battle to a successful culmination. We must assume that he is sincere in his statement. He is well known in Illinois and his friends insist that he has always been dependable and honest. The assistance of men such as Dr. Parran will be great when the final decision is to be made by those in high positions of authority and power.

The Secretary of the Illinois State Medical Society will attend a special meeting of the Public Health Service, to be held in Washington, to consider the manner of conducting the campaign against syphilis. Dr. Camp will be one of seven delegates from the state of Illinois. He should return in time to report at the next meeting of the Council in Peoria, early in January. At that time the Council should be able to arrive at a definite decision as to the stand of the Illinois State Medical Society. Surely the least the medical profession can do is to approve the work and to cooperate if possible.

The Chairman of this Committee with Dr. Wilkinson, who has given particular attention to this subject for several years, attended a special meeting of the Council of the Chicago Medical Society where the subject of the recently formed Group Hospitalization Plan was discussed. There still remains a great difference of opinion among the doctors and no definite decision was arrived at. The presentation of the plan by the incorporators, made up almost entirely of non-medical men, was made and they were able to answer all questions asked. They seemed honest and sincere and made a good impression on those present. One left the meeting with the feeling that regardless of any action by organized medicine, the plan would be put in operation in the near future. Recent articles in the lay press have substantiated this opinion. Without the medical profession actively participating in the operation of the plan, one must admit the probable dangers which lurk therein, as the plan develops and becomes more inclusive. As we have mentioned many times before, it is unfortunate that the medical profession does not lead in the planning of such work and so often is merely either ignored or called in after the plans are all made. We should be the leaders and not silent followers in all things involving the health of the community. Both Dr. Wilkinson and the chairman wish to thank the officers of the Chicago Medical Society for the invitation to attend the meeting.

The New York Medical Society continues its fight against State Medicine by using publicity in a manner which should be studied by all state medical societies. It is very fortunate that such a key state as New York has such able, militant leadership. Practically every newspaper in the state carries articles at regular intervals under the supervision and sponsorship of the local county medical society. In addition they carry paid articles, in which the people are informed on health subjects and the opinion of the medical profession as to changes needed and proposed. Naturally, they influence both the laity and the legislators. These latter are most important, for they must have definite information if they are to vote intelligently at the next meet-

ing of the legislature to be held in 1937, when important medical legislation is to be considered.

It has recently come to the attention of the Committee, that one of the provisions of the Social Security Law, provides for the formation of either county or district health boards. These are to be made up of one physician, two engineers, one nurse and one social worker. The medical profession should give some thought as to whether such a set-up meets with their approval, so that they can advise the legislature of their desires in the matter, when they meet in January to consider new legislation on this subject. Without complete understanding of the plan and the manner in which it will be administered, it is impossible to arrive at the proper decision and be able to advise the lawmakers.

The ever present question of the care of the indigent has received further study at the hands of a Committee, headed by Dr. John Neal of Springfield. They have a report ready at this time and it will follow this article in this column. It should be read by every man in active practice in Illinois. You will note that the office of County and Township physician is gradually being done away with although there are still fifteen counties in the state, where a contract physician is still employed. We must evolve a uniform plan for the state, doing away with all contract physicians and giving the sick free choice of physicians. A second article, directly following that of Dr. Neal is from the pen of Dr. E. P. Coleman of Canton. He presents "Recent Problems Confronting the Medical Profession" in a manner which will stimulate your interest and make you do some thinking. Take time to read both of these articles.

E. S. Hamilton, M. D.,
Chairman of Committee.

MEDICAL SERVICE FOR THE POOR

Report on a Survey in Illinois

JOHN R. NEAL, M. D.,
Chairman Committee on Indigent Medical Care

Lack of uniformity in policy or plan is the most impressive feature of the methods now employed in providing medical services to the poor in Illinois. Indeed, it may be said that, by and large, neither the organized medical profession nor the constituted political authorities have adopted any well-defined policy or developed any clear-cut program of caring for the indigent sick. While organized medicine unanimously favors the principle of guaranteeing to the poor their choice of physicians, some form of contract medicine with respect to the indigent prevails in fifteen counties.

These features are outstanding in the findings of a study recently completed by the Illinois State Medical Society. The information was collected on forms sent out by the Secretary of the State Society to the Secretary of each county society. Returns were received from 80 counties. Definite policies and plans with respect to procedures and fees which have been discussed and approved by the medical societies and the county boards, prevail in only 21 counties among those submitting schedules.

The legal machinery as well as the traditional attitude of physicians are both factors in the present situation. According to law, the financial responsibility of providing medical care for the poor rests upon the township except in the 17 counties with the commission form of government, where it devolves upon the county. For this reason the county boards, except for the 17, have no legal authority for setting up a county-wide system of medical care for the indigent. Physicians, on the other hand, have from ancient times, accepted the responsibility of taking care of the poor among their clientele without compensation. This practice has tended to smother interest on the part of many physicians in developing systems of medical service for the poor which involve definite fee schedules and compensation.

Changes in the social order which have created a large population of unemployed, on the one hand, and a demand for more extensive medical services for the financially disabled, on the other, have created a new problem that defies solution by former methods. The volume of medical care required by the poor is too great for the medical profession to carry gratuitously. It is, moreover, a public responsibility, devolving upon other members of society no less than upon physicians.

The time seems ripe, therefore, for the development of policies and plans that will meet the situation as satisfactorily as may be, and which can be adopted uniformly throughout the State. The survey was the first step on the part of the Illinois State Medical Society toward this end.

The study disclosed that contract medicine,

with respect to the poor, prevails to some degree in 15 counties. In most cases the contract is limited to one or a few townships. In Sangamon County, for example, Capitol Township employs a physician at $4,000 per year to provide medical care to the indigent. This physician also has an agreement on a reduced fee basis to take care of the poor from two other townships. In Henry County a similar method prevails, Kewanee Township employing a physicians at $650 per year who also collects $50 per year from a contiguous township. Macon County pays $200 per month to a physician who agrees to do all necessary medical work for the poor. Among the fifteen counties in this category the contract physician undertakes to provide medical care for all indigents in each of 7 counties while his services are limited to one or more townships up to about three in 8 other counties.

Schedules returned by the secretaries of the county medical societies show that this system is the least satisfactory of all to the profession. It denies to patients the choice of physician, on the one hand, and usually places on one doctor so much work that he cannot possibly give a satisfactorily high standard of medical care to the patients. It introduces the element of bargaining into a contract which tends to give preference of employment to physicians of secondary professional ability or to those with political strength.

The counties in which one or more townships employ physicians on a contract basis include the following:

Clinton	Morgan
Henry	Peoria
Iroquois	Sangamon
Kane	Shelby
Knox	Wabash
McHenry	Warren
McLean	Will
Macon	Grundy
Montgomery	

The Kankakee County plan is unique in Illinois. All financial matters are arranged between the County Medical Society and the County Board of Supervisors. At the present time the Society collects $75.00 per month from the Board in return for providing ordinary medical service for the poor. Surgical and obstetrical services are paid for in addition to this regular monthly stipend. The Society uses this income to defray membership fees and to provide library and other facilities for its members. Medical services are provided by the members on a rotating plan. This system appears to be operating satisfactorily to all concerned.

In twenty other counties the medical societies and the county boards have arrived at mutual agreements which establish on a county basis a definite policy, uniform maximum fees, a choice of physicians in most instances, and systematic procedures in providing medical care for the poor. The plans followed, however, vary considerably from county to county. In Champaign County, for example, the Society members who wish to participate, are organized into teams of 5 which serve on a rotating schedule over a period of six weeks, and the work is done at the County Hospital on a specified fee basis, paid for by the County Board. This limits somewhat the free choice of physicians by patients but appears to operate satisfactorily.

In Henderson County, on the other hand, the patient initiates the procedure by making contact with the physician of his choice. The doctor then makes contact with the supervisor of the township in which the patient lives, and this supervisor takes the matter up with two other supervisors, making a committee of three. If this committee accepts the responsibility, the physician is notified and performs the service at the expense of the county. If the work is done prior to authorization by the committee, the doctor's bill is not allowed. Although a schedule of fees was drawn up by the Society, bills are usually discounted to the extent of 40 or 50 per cent.

In other counties of this group, the practice varies in detail. Supervisors in some instances influence the choice of physicians by requiring patients to apply first to the supervisor and make contact with physicians only upon his recommendation and authorization. Through this method, a good deal of surgical work is diverted from DuPage County to free clinics in Chicago. Fee schedules range from 50 to 100 per cent of regular fees but collections are not always complete. A reasonable degree of satisfaction among the medical profession prevails in the twenty-one counties where mutual agreements between the Societies and the County Boards have been effected. While from a legal standpoint administration is based upon township units, counties have accepted responsibility through action of

the Board which is representative of all townships.

Counties where mutual agreements prevail include the following:

Adams	Jersey
Alexander	Johnson
Boone	Kankakee
Champaign	Lee
Clark	Marion
Coles-Cumberland	Massac
DeKalb	Ogle
DuPage	Vermillion
Henderson	Woodford
Jackson	? unidentified schedule

No county-wide plan has been adopted in any of a group of 39 counties. These operate on a township basis. The medical societies in ten of these counties have made unsuccessful efforts to establish county plans. Little or no effort in this direction appears to have been exerted by the medical profession in the other counties. In all 39, however, there has developed a general understanding with respect to fees, although full payment is not always forthcoming. Generally the I. E. R. C. schedule has carried over without direct action on the part of either the medical profession or the political authorities. Methods of approach varied widely where efforts to establish a definite understanding were made. In Greene County, for example, the medical profession simply declared that the emergency had terminated and wrote a letter to that effect to each supervisor. This letter, which was signed by each member of the medical profession proclaimed an end of reduced fees, but set up a schedule somewhat lower than regular fees. It has not been ratified by the supervisors, however, and the 50 per cent fees of the I. E. R. C. still prevail. A committee from the Pike County Society met with a committee from the Board and agreed upon a plan and schedule but it was not accepted by the Board. In Winnebago County a committee from the Society met with the Board and agreed to continue under the I. E. R. C. plan. However, all hospitalized indigents go to the County Hospital which maintains a closed staff. This often cuts off the physician of choice and creates dissatisfaction to some degree.

Most of the counties in this category have made no attempt to establish a definite system of providing medical care to the poor. "We, as a Society," says the secretary of the Edwards Society, "just told them (County Board) that every physician would take care of cases coming to him." Bills are presented to the overseer of the poor for approval and if accepted, presented to the County Commission for payment. In LaSalle County there is "no definite plan. Doctors in each community make agreements with the supervisor." Edgar County has "no society plan." Patients apply to supervisor who executes an order that authorizes the physicians of choice to provide necessary services at the expense of the county.

In only two counties of this category, Fulton and Livingston, are patients denied entirely the right to select their own physicians. The supervisors make the choice in those. In four others, Christian, Madison, Pike and Tazewell, some of the supervisors specify the physicians whom patients must employ.

The 39 counties which have no definite agreement with the county boards, but which operate on a fairly well established schedule under township administration include the following:

Bureau	Lawrence
Carroll	Livingston
Cass	Logan
Christian	McDonough
Clay	Macoupin
DeWitt	Madison
Douglas	Mason
Edgar	Menard
Edwards	Pike
Effingham	Pulaski
Franklin	St. Clair
Fulton	Saline
Gallatin	Schuyler
Greene	Stephenson
Hancock	Tazewell
Hardin	White
Jasper	Whiteside
Jersey	Williamson
JoDaviess	Winnebago
LaSalle	

Four counties, Randolph, Richland, Washington and Wayne, appear to have no plan of any kind. In Randolph County the "burden since discontinuance of former relief plan falls upon individual physicians," while in Richland there is "no understanding between county board of supervisors and physicians of county in regard to indigents' medical care. Only acute surgical cases come to the attention of physicians and remuneration is provided only when hospital contacts supervisor." Except for inhabitants of the jail and county farm, indigents go from one doctor to another in Washington County, while in Wayne County the doctors "accept what is offered and chew the rag" in return for services provided for the poor.

The Rock Island County Medical Society has considered the problem of medical relief very

carefully. A definite plan and fee schedule has been worked out on a fifty per cent. reduction basis with maximum aggregate amounts specified for individual physicians. Free choice of physicians is stipulated. This plan has been submitted to the County Board but not yet adopted.

The survey discloses two outstanding features with respect to providing medical care for the poor. One is that contract medicine or any other method which denies to the patient a free choice of physician is always unsatisfactory and usually results in a low quality of medical service. The other is that a definite plan based upon an established policy agreed upon by the organized medical profession and the political authorities produces the most satisfactory results for all concerned.

Contract medicine still prevails to some degree in fifteen counties while the lack of uniformity in policy and plans leaves much to be desired throughout the State.

Committee on the Care of the Indigent.

Dr. John R. Neal, *Chairman*,
Springfield, Illinois.
Dr. E. S. Hamilton, Kankakee.
Dr. E. P. Coleman, Canton.
Dr. Chas. B. Reed, Chicago.
Dr. I. H. Neece, Decatur.
Dr. Chas. S. Skaggs, East St. Louis.
Dr. C. E. Wilkinson, Danville.
Dr. Chas. H. Phifer, Chicago.
Dr. H. M. Camp, Monmouth.

RECENT PROBLEMS CONFRONTING MEDICAL PRACTICE

The most casual examination of some recent magazine and newspaper articles indicates that physicians are going to be compelled to devote more time and thought to their own economic interests. The threat of compulsory health insurance and the associated danger of socialization of the practice of medicine is appearing as an ever increasing menace to us all. We, as doctors who have studied the comparative superior type of medical care afforded to the people of this country, as contrasted with the relative inefficiency of that obtained in European countries where health insurance under State domination has caused so much expense and dissatisfaction, realize that there is no need for such experimentation here. Our present task is to continue our efforts to educate the public to this realization.

A campaign has been started recently to convey to the public the erroneous idea that at least two health problems have been beyond the control of scientific medicine. The public has been accustomed to receiving such uniformly good medical service that it tends to believe any stories with a medical problem without trying to analyze the accuracy of such information. Especially so when published in an otherwise reliable paper. It is now being informed that one in ten is a victim of syphilis. The general idea conveyed seems to be that most of the victims have acquired the disease innocently and that they are unable to obtain adequate treatment because of the high cost of such treatment and the financial inability of these innocent victims. We know that these ideas are untrue, but while we should be ready to cooperate in every way to help lessen the incidence of this disease and to do all in our power to eradicate it, we should also notify the public of these facts. That, due in fact to the free arsenicals furnished by the State Department of Health, this disease can be treated successfully, and the expense kept within the means of any of its victims, innocent or otherwise. That the average doctor is not seeing any tremendous increase in venereal diseases in his own practice and that the State insane asylums are filled with cases of dementia praecox, rather than with paresis or any other manifestation of syphilis. This to correct the general impression the neuro-syphilis provides 95 per cent. of the asylum population in the State. That while the present incidence of syphilis is all too high, it is due to the moral standards of the present generation and not to any inability on the part of the patient to receive treatment.

The public is also being told that there is an excessively high maternal death rate in this country. A number of doctors who apparently must obtain their medical information from daily papers and popular magazine writers, rather than from scientific journals, have echoed this statement. Women's Clubs are being assigned the duty of lowering this rate and again the implication is that there is a lack of medical care for expectant mothers. It is stated that it is unsafe for a woman to be confined in a general hospital because these places are said to reek with infection. One might as well say that it is unsafe for a patient with pulmonary tuberculosis to be in

a sanitorium for treatment, because so many people with this disease die in sanitoria.

We as a profession need to correct these misstatements and to a limited degree this can be done in the following ways. We must notify the public of the facts that the foreign maternal mortality reports, exclude many conditions that are included in our reports from Washington. They should be given to realize that our records include such things as criminal and self-induced abortion, deaths due to heart disease in pregnant women, etc. It might even be well for them to know that some of the excellent results in some maternity centers are due in part to the fact that some obstetrical cases treated in the outpatient department have been denied admission to the main hospital when puerperal sepsis developed and have been cared for in general hospitals near by, with a more liberal policy. Those who died lowered the average for the general hospital but the paper record of the special hospital was of course kept unimpaired. Yet the general hospital staff was doing its duty in attempting to help the patient who was not its original responsibility.

Information should be given to the public in as many ways as possible, by presenting our ideas before the usual sources, such as luncheon clubs, women's organizations, men's clubs, etc. In order to disseminate this information more extensively, it might be possible at times to have such addresses prepared in advance in newspaper form and delivered to the local papers on the day the address is given so that the publisher can use it if he sees fit while it is still recent news. When this can be done, a talk that is heard by a few dozen at most, can be put in the hands of several thousand with very little added effort.

So long as half truths or untruths are being given to the public, our best defense is to tell our patients the exact facts and to be willing to cooperate and *to lead* in any public drive to improve health conditions in our communities.

In many communities, throughout the State, the problem of medical care for the indigent has been made difficult due to the fact that each supervisor has his own ideas as to what constitutes such care. He would much rather spend his township funds grading roads past the farms of the heavier taxpayers, than to put it to the much less spectacular purpose of treating a few indigent sick. In a few places where it seemed impossible for the supervisors and the County Medical Societies to get together, a fee schedule was arranged by the Society with a rate low enough to satisfy any fair minded supervisor and mailed to each one on the Board of Supervisors. The result has been that many of the men who would not agree with the Medical Society as a group, are now letting their indigents select the physician of their choice and making payments according to this schedule. Further contacts along this line, especially through the medium of the family physician may enable us to avoid the worst abuses of the pre-relief relief system where an overworked country doctor cared for some of the indigents for an insufficient sum, and his colleagues did the bulk of the work for nothing; all this while every other pauper need was being paid for at regular rates.

A county pauper fee bill may be an unfortunate necessity but it is an improvement over the old method formerly in vogue. A unified county society can help with many of the economic problems of its members, and be of great aid in preventing an unwarranted invasion of the field by non-medical people.

E. P. Coleman, Canton, Ill.,
Councilor, 4th District.

CLUB DUES VERSUS MEDICAL SOCIETY DUES

Ever and anon a complaint is received in regard to medical society membership dues. As a rule the complaining member is a member in name only, he attends his county and state meetings on rare occasions and is possessed of little information as to what is being done in defense of his profession or to prevent outside encroachment on his practice and livelihood. By non-attendance he neglects opportunities to improve his professional ability and standards of practice.

When questioned it is found that the complainant is a member of several clubs and lay social organization. He pays from $75 to $150 for the privilege of playing golf. Dues of $60 to $125 are paid for admission to a club where he can pay 85 cents to $1.25 for his noon lunch, an hour of bridge, billiards or checks, and say "Howdy" to the banker, lawyer or merchant Pooh Bah of his town. He readily remits $50 to $100 per year to some luncheon club where he

can sing the "old songs," be called Jack, and listen for thirty minutes to some imported speaker describe how a can is made in six operations from one small piece of tin. Then there is the lodge, church, fishing or skeet club, and possibly one or two other lay organizations. All told, his nonmedical organizations tap him for from $200 to $400 for yearly dues. His medical society dues average from $20 to $50 per year the average being about $25 per year.

Criticism is not directed against membership in these organizations, provided income permits. Criticism is directed against such membership when complaint is made, "we are paying too much for what we get." That claim is challenged because facts exist to disprove that statement. The trouble is that this member has never taken the pains to ascertain or acquire the full benefits of membership in his county medical society. He can secure the facts by reading the editorials and Association activities columns in the preceding twelve issues of *California and Western Medicine*. For value received a physician obtains more from his medical dues than he obtains from his dues paid to nonmedical organizations. The value of returns is so great and membership benefits so vital that an eligible physician cannot afford *not* to be a member.—*California and Western Medicine.*

DON'T GRUMBLE ABOUT YOUR MEDICAL SOCIETY DUES

New York State Journal of Medicine is authority for the following:

TO GRUMBLERS

Doctors who think their medical society dues are high are told by the New York Medical Week to cast a glance at the dues of $20 in the County Lawyers Association, of $75 in the Bar Association, of $30 in the Plumbers Union (with $200 initiation fee), and $64 in the Electrical Workers (with $100 initiation). Instead of being high, "the county society dues are low—too low, in fact, to sustain the ever-expanding duties which organized medicine must assume. . . ." Many spheres of influence are closed to the profession because its official organizations have not the funds for active participation in important movements."

DOCTORS WISHING TO PRESENT PAPERS AT THE ANNUAL MEETING OF THE STATE SOCIETY

The officers of the Section on Medicine of the Illinois State Medical Society are now preparing the program for the forthcoming session at Peoria in May of 1937. Any member of the Society wishing to present a paper may send the same or a satisfactory abstract thereof to the officers of the Section as promptly as possible. It is desired that the program should be completed by the 15th of February. Members from Cook County may send papers or abstracts to Dr. James G. Carr, 30 North Michigan Avenue, while members from other parts of the State will please send their abstracts or papers to Dr. Cecil M. Jack, Decatur, Ill.

A PROMISING TREATMENT FOR EPILEPSY

Orpheus E. Wright, M. D., Winston-Salem, N. C., in the November issue of *Southern Medicine & Surgery* reports a case of Idiopathic Epilepsy treated by the usual course of Antirabic Vaccine.

We quote in part: "In April, 1935, while in the City Laboratory, I heard a man who had brought in a dog's head for examination for possible hydrophobia infection telling the technician that since he took the hydrophobia vaccine five years ago, he had not had a single epileptic attack. He related that he formerly had been subject to typical and frequent seizures of the most severe grand mal type; on account of this that he could not retain a steady job; and that, five years ago, he had been exposed to hydrophobia and had been given the standard treatment of vaccine, since which time he has had no seizure.

"Realizing that the anti-rabies vaccine is made from the desiccated spinal cord of the rabbit and that epilepsy is a disease of the central nervous system, I wondered if probably the sequence of events in this case might be cause and effect rather than happenings connected in point of time only. I resolved, therefore, to submit the case to the patient whom I had been treating.

"The patient was willing to try out its merits, so I gave him the full course of 21 injections just under the skin of the lower abdomen, in April and May, 1936. *Up until the present he has not had another seizure.* His general health has shown marked improvement, much of the

apathetic disposition and the moron-like conversation has disappeared. He has put in a full summer's work on a farm and is an entirely different individual.

Correspondence

COMMUNICATION SENT TO ALL MEMBERS OF THE STATE LEGISLATURE

Tne Illinois State Medical Society wishes to express to you its profound interest in any and all proposed legislation of a medical character that may come up for consideration in the forthcoming session of the General Assembly and to ask for an audience on such matters before you commit yourself to measures in this field. Many bills relating to the practice of medicine, the licensure of various cults, vivi-section, health insurance, the requirement that teachers and others obtain health certificates, and to sundry other matters bearing upon medical affairs will undoubtedly be introduced.

A fair and judicious appraisal of these bills, so that legislative action may result in public benefit rather than advantage to selfish interests and sentimental enthusiasm, will require a comprehensive conception of the possibilities and limitations of scientific medicine and the social implications involved. Representing more than 10,000 physicians whose training, experience and observation in the treatment of human ailments and in the protection of health, the Illinois State Medical Society is in a better position than any other agency to express sound, valid, scientific opinions on the practicable character of proposed legislation affecting medicine and health. It requests the opportunity of being heard on such matters.

The Illinois State Medical Society believes that the door to practice medicine should be open wide to every person who meets the legal qualifications for leinsure, but that these requirements should be high enough to protect the public against incompetence and fraud. It believes that the best possible medical care should be provided to every citizen who needs it but that the system of practice should be sound economically and socially. It believes that the future holds out the promise of greater scientific medical progress than has been achieved in the past and that competent research workers should not be handicapped by unreasonable legal restrictions. It believes in an adequate, efficient public health service but that the State should not undertake the practice of medicine.

The Society has confidence in your good judgment. It believes that merit in proposed legislation will be the deciding factor in your position on bills. It understands the limitations on your time and energy at Springfield. For these reasons the Society has never and does not propose in the future to maintain or bring to Springfield organized bands of lobbyists or to impose upon you a flood of telegrams from an "alarmed" public or sentimental communications from "grateful" patients. We believe that you will appreciate this attitude.

Our request is simply that you maintain an open mind on legislative proposals relating to medicine and health until you have considered the evidence that may be presented by a competent representative of the medical profession.

This course has been pursued by the members of the General Assembly in the past. As a result, Illinois enjoys a standard of medical service unsurpassed by any State in the Union. The public and individual health conditions in this State are second to none. The medical profession is proud of this record and hopes to maintain it.

The State Medical Society will appreciate the opportunity of cooperating with you to this end.

Very truly yours,

J. R. Neal, M. D.
Chairman Legislative Committee,
Illinois State Medical Society.

INVERSION OF THE UTERUS

To the Editor:

Inversion of the uterus is unusual enough to make the following interesting:

Miss T. C., age 24 years, primipara; last menstrual period on Nov. 25, 1935; expected time of labor, Sept. 2, 1936. Gestation period was uneventful. Diagnosis of breech presentation was made in the office before labor.

She was a heavy, strong, healthy girl. Pelvic measurements were normal. At 6 a. m. on September 2, the membranes ruptured. She entered St. Elizabeth Hospital and was observed throughout the day. Active labor started at 6 p. m. At 8 p. m. she was given 2 capsules of seconal and

at 9 p. m. 3 capsules, 4½ grs. nembutal; at 9:20 p. m. she was given ether in oil with paraldehyd, per rectum. She was well relieved of pain. Dilatation was complete at 10:20 p. m. At 10:30 p. m. she was put in stirrups and prepared for delivery by breech extraction. She was given 2 minims pituitrin and a little ether for the delivery. She had an episiotomy. The extraction was not difficult. The babe weighed 7 lbs., 11¼ oz. The third stage was 12 minutes.

The uterus was not felt very definitely on account of a heavy abdomen. Moderate pressure on the uterus and slight traction of the cord, delivered, what was supposedly, the placenta. Instead, at this time it was noticed that the uterus with the placenta attached had inverted through the vagina and well through the vulva. This condition was recognized immediately. The patient was in stirrups and under anesthesia. The placenta was detached and the funds was grasped firmly and gradually replaced through the cervix into the abdomen. This replacement was felt distinctly by internal as well as external hand. The uterus was replaced without difficulty, probably within 2 minutes after its inversion. There was apparently no shock and hemorrhage was not at all severe. The cervix could be felt perfectly intact. The uterus was not packed. The episiotomy wound was repaired in the regular way after which the cervix was again examined and found normal.

The patient's convalescence was entirely normal. Her highest temperature was 99°; pulse ranged from 80 to 96 during the next few days. She left the Hospital on September 12, 10 days after delivery, which is our routine in normal cases. Examination on Oct. 23, 1936, seven weeks past partem showed the uterus and cervix exactly as would be expected following normal labor.

I am reporting this case on account of the rarity of this condition and I hope it will be of interest to obstetricians.

O. H. CRIST, Danville, Ill.

A MORAL TO JUST A LITTLE SAMPLE

An innocent little sample was left on the desk of my friend Doctor. The sample was a medical one left by a leading pharmaceutical house—for cough.

A patient came in, the Doctor was very busy, he had no time to examine and prescribe for this coughing patient, so handed the sample to the patient and dismissed her. The sample did the work and so the patient passed the label to her neighbor and this little label netted—51 refills and the result—the druggist got his, but the Doctor got nothing and further deprived other Doctors of a good fee. There is a moral to "just a little sample," for 1937.

DR. A. R. REDER.

EDUCATIONAL COMMITTEE

Report for December

SCIENTIFIC SERVICE:

County medical societies find helpful the service of the Committee in supplying scientific programs, as indicated by the following speakers scheduled during the month:

DuPage County—Dr. Clark W. Finnerud—"Diagnosis and Treatment of Common Skin Diseases."

Will-Grundy—Dr. Horace Stimson.

Perry County—Dr. O. P. J. Falk of St. Louis—"The Cardio-Vascular Complications in Diabetes."

Perry County—Dr. E. V. Mastin of St. Louis—"Surgical Handling of the Thyrotoxic Patient."

Bureau County—Dr. Harry Mock—"Skull Fractures."

Will-Grundy—Dr. C. J. Barborka.

Northeastern Indiana Academy of Medicine—Dr. Eugene F. Traut—"Chronic Arthritis: Its Causes, Prognosis and Treatment."

Jo Daviess County—Dr. Roswell T. Pettit—"Cancer of the Breast."

Livingston County—Dr. Don C. Sutton—"The Old Myocardio Case with Reference to Treatment and Diagnosis."

Livingston County—Dr. James T. Case—"Some Phases of Colonic Diagnosis."

Winnebago County—Dr. Edward Lyman Cornell—"Some of the Newer Developments in Obstetrics."

Winnebago County—Miss Anita Jones of the New York Maternity Center—"The Nurses Part in Maternal Care."

Franklin County—Dr. Dudley Smith of St. Louis—"Treatment of Gonorrhea in the Female."

Franklin County—Dr. Rogers Deakin of St. Louis—"Treatment of Gonorrhea in the Male."

SPEAKERS BUREAU:

30 Physicians were scheduled to present popular health talks before the following groups:

Boys and Girls of Marcy Center, Chicago—Dr. I. Tregier.

Staunton Woman's Club—Dr. A. F. Kaeser.

Boys Chicago Community Center—Dr. Harry M. Hedge.

Girls Chicago Community Center—Dr. Alice Conklin.

Edward Hines Hospital Nursing Staff—Dr. P. A. Teschner.
Park Manor Woman's Club—Dr. Alex S. Hershfield.
Maywood Woman's Club—Dr. W. O. Thompson.
Brainerd Woman's Club—Dr. Frank G. Murphy.
Central Y. M. C. A.—Nine programs.
Wilmington High School Boys—Dr. Donald Killinger.
Y. M. C. A. Hotel, Chicago—Dr. Howard Wakefield.
First Methodist Church, Evanston—Dr. P. A. Teschner.
Crystal Lake Woman's Club—Dr. E. H. Weld.
Darwin Parent Teacher Association—Dr. I. H. Tumpeer.
Itasca Woman's Club—Dr. M. M. Kunde.
District High School P. T. A. Conference—Dr. Leo Mayer, Dr. Robert H. Hayes, Dr. George K. Fenn.
Wilson Avenue Y. M. C. A.—Dr. Cleveland J. White.
Lewis-Champlin Parent Teacher Association—Dr. A. C. Rambar.
Clearing Woman's Club—Dr. S. C. Kehl.
Graeme Stewart P. T. A.—Dr. M. P. Borovsky.
Park Manor Congregational Men's Club—Dr. R. K. Packard.
Kankakee Rotary Club—Dr. Guy Cushing.

Reports from chairmen of these programs are interesting:

"Very much enjoyed."

"This was the first program of this type that we have had and everyone enjoyed it immensely."

"Very satisfactory and well liked by the boys."

"Interesting material, well presented. Everyone was pleased with this talk."

"Was enjoyed by all. Was ethical and that means much."

"Excellent speaker. Covered his subject thoroughly. Appreciative remarks by those attending."

"Very good talk and enjoyed by the club very much. Individual congratulations of program numerous and made front page of local paper."

The requests for speakers continue to come in. Only clubs that can guarantee an audience of fifty are being supplied with speakers and if funds are available we have not been hesitant in urging them to pay the expenses of the speaker and a small honorarium.

We could take care of more requests from cities down state and hope that doctors belonging to service clubs will try to arrange programs through the Committee office.

The great amount of publicity being given to Venereal Diseases is creating interest and requests for talks on these subjects are increasing.

Dr. Normal L. Sheehe, Department Surgeon of the American Legion, has written the Committee:

"Thank you for the health talk topics you sent me and for the assistance offered by your Committee in regard to them. I am sure they would prove advantageous and I intend to send out a bulletin to the various Posts throughout the State asking them to formulate such a program in their year's work. The talks would not only be instructive but would make for the best of harmony between the two groups which would prove advantageous all around."

RADIO:

20 Radio programs were given on the following subjects:

Parent and Child Relationship.
Defects in Children's Eyes.
Respiration.
Round table discussion on the Handicapped Child by 3 pediatricians.
The Common Cold.
School Health Inventory.
Rheumatic Fever.
Infections of the Fingers and Hands.
Medical Christmas Gifts.
All Is Not Gold That Glitters.
Contagious Diseases in Children.
Significance of Ear Noises.
Headache.
Convalescent Care of Anterior Poliomyelitis.
Inventory Time.
Epilepsy and Convulsive States.
The Hygiene of Pregnancy.
The Obstructed or Blocked Nose.
X-Rays and Health.
Common Colds Prevalent.

A few weeks ago a letter was received in the office of the Committee from F. A. Davis Company, Medical Publishers of Philadelphia, which stated:

"We are interested in the problems of Preventive Medicine as Applied to Public Health.

"To my desk have come news items regarding the many broadcasts given on this subject by accredited medical associations. As editor for one of the oldest and most ethical medical publishers, it is our business to know adequately all new developments in the medical field. In communicating with Dr. W. W. Bauer of the American Medical Association, he suggested your Association as one which has been doing most excellent work in this field.

"Therefore, I write to you with the hope that we may be placed on your mailing list to receive a copy of future broadcasts."

Copies of some of the broadcasts were sent to the Davis Company, after conversation with Dr. Teschner who is Dr. Bauer's assistant. A letter then came from the Company as follows:

"Thank you for your letter of December 3rd and its most interesting material. Certainly, the Illinois Medical Association is to be congratulated on its extensive use of radio as a means of communication in Preventive Medicine and the indications that newspapers as well as radio are lending valuable assistance to such important work.

"As you supposed, I am interested in your additional activities. Apparently your Society has been unusually successful in supplying the Health News for newspapers at a time when authentic and wise material in such mediums is needed greatly.

"I shall be very much interested in the extent to which this activity has been carried, the names of the papers cooperating, etc. We often have questions concerning present successful methods in such a field."

NEWSPAPER SERVICE:

538—Press articles to Illinois newspapers—many releases on subjects such as colds, influenza, pneumonia, sinus trouble, etc.

396—Health articles to public libraries in the state.

108—Health articles to Health Chairmen and Home Advisers.

5—Notices to Chicago papers of Chicago Medical meetings.

Material prepared for the Illinois Federation of Women's Clubs:

100—Radio talks mimeographed.

100—Letters for Health Chairmen mimeographed.

MISCELLANEOUS:

The Chicago Rotary Club and the Chicago Chamber of Commerce are carrying on an experiment in Vocational Guidance for a selected group of fifty young men of the North Park College. Panel discussions have been held by prominent manufacturers of Chicago, the Chicago Bar Association, the Retail Merchants Association, and others. The medical society was invited to participate by planning a panel discussion of "Vocational Outlook for Youth in Medicine." Doctor Ferguson and Miss McArthur met with Mr. Nelson of the Rotary Club who is chairman of the experiment, and with Dr. Thomas P. Foley, President of the Chicago Medical Society. The general plan was arranged and Doctor Foley will carry on with the project and it is hoped that the discussion will take place in the Cook County Hospital Amphitheater early in January with the various phases of medicine being presented by Doctors Morris Fishbein, Irving S. Cutter, David J. Davis and Thomas P. Foley.

The Marshall Field & Company Annex window display has attracted considerable attention not only from Illinois Citizens but we have had comments from Nebraska and New York City.

The December window carried out the idea that "Christmas Gifts for Children Should Include Immunization against Contagious Disease" and displayed a report showing the number of people in quarantine during the 1935 Christmas holidays.

It is hoped that the exhibits can be made suitable for other windows throughout the state. The Secretary of the Sangamon County Medical Society has asked to have the use of the material after it is removed from the Marshall Field window.

PARENT TEACHER ASSOCIATIONS:

The Summer Round-Up Chairman for the Illinois Congress of Parents and Teachers has promised to send to the Educational Committee office a list of the schools registering for the Summer Round-up campaigns next spring. County medical societies will be notified of the schools in their counties where such work is contemplated. Lay chairmen will be urged to consult with the proper medical representatives before making plans to have examinations so that the local doctors can offer guidance and determine the *method* of examination.

INFANT AND MATERNAL WELFARE IN THE STATE:

Doctor Ferguson and Miss McArthur met with a Committee interested in the Infant and Maternal Welfare program to be carried on in Illinois. This will be discussed by Doctor Ferguson at the Council meeting.

BOARD OF EDUCATION CONFERENCE:

Doctor Ferguson and Miss McArthur were invited to attend a conference in the office of the Superintendent of the Chicago public schools, Representatives of the Chicago Medical Society, Dental and Ophthalmological Societies, the Chicago Health Department, were present together with others from the Illinois Congress of Parents and Teachers. The meeting resulted in an ultimatum by Dr. Johnson, Superintendent, that no health work or examinations should be undertaken in any of the Chicago schools until permission had been secured from him and after the program had been gone over by a committee he is organizing with representatives of the P. T. A., Chicago Dental, Chicago Health Department.

Respectfully submitted,

Jean McArthur, Secretary.

WOMAN'S AUXILIARY TO THE ILLINOIS STATE MEDICAL SOCIETY

Without inspiration no group can successfully carry on to the goal set by past and present leaders. At the Board meeting held in Chicago in November such encouragement was given to all. Invitations were sent to County presidents to attend the session and also to have the privilege of hearing Mrs. Robert Fitzgerald, National President. Mrs. Fitzgerald stressed the dignity of our position in the community as doctors' wives and the opportunity it gave us to further the aims and ideals of "the most distinguished lay group in America." Three county presidents responded—Mrs. G. H. Mundt, Cook County; Mrs. H. L. Shafer, Livingston County, and Mrs. A. O. Sistler, Vermilion County.

As a part of their efforts to bring the profession before the public in a dignified manner, many counties are planning Laity Days. Two very successful ones were held in November—Cook County, with over a hundred in attendance, and Kane County, reporting over three hundred. In these meetings, women's clubs, P.T.A. and civic groups are represented, thus spreading the gospel of health to a vast number of people. Other activities of the Auxiliaries as a spur to greater effort:

Livingston County conducted their annual food shower for St. James Hospital, Pontiac, thus continuing the service ideal.

Bureau County plans an intensive study of women medics; in addition, they have arranged three parties to raise funds for the Bureau County Crippled Children's Clinic.

Will-Grundy County: purchasing books for the Auxiliary library from the approved list. They have had much pleasure and instruction in the speakers selected—Mrs. F. P. Hammond, State President; Dr. F.

J. Clancy, A.M.A. Bureau of Investigation, and Dr. Mary Schroeder, Elgin State Hospital. A Christmas shower for the Crippled Children's Clinic is an annual event and also subscribing to the Milk Fund. Noted speakers are the rule on all programs, as the following list shows:

Englewood Branch, Cook County—Drs. E. H. Hagens and H. Wm. Elghammer.

Central Branch, Cook County—Laity Day: Mrs. Robt. Fitzgerald, Natl. Pres.

North Shore Branch, Cook County—Irene Peyron, Major in Salvation Army; Mary D. Bailey, Assistant State's Attorney.

St. Clair County: entertained physicians; discussed Social Security articles from *Hygeia*, an interesting part of their programs. Secured Drs. C. S. Skaggs, V. P Siegel, Mrs. F. P. Hammond and Mrs. H. B. Henkel, also sponsoring series of radio broadcasts.

McLean County: Dr. Hibler, Illinois State Normal University; Dr. J. Armour Lindsay, Superintendent Bloomington Schools; Dr. L. T. Fruin. It is possible that McLean County will have another Dr. Seymour. A son was born to Dr. and Mrs. Guy E. Seymour in November.

And so the work goes. A great variety of interests —as wide as the life of a physician of the world.

To *Hygeia* Chairmen:

CASH PRIZES—CONTEST FOR HYGEIA SUBSCRIPTIONS

The sum of $150.00 will be given in cash prizes to the County Auxiliaries securing the largest number of subscriptions credits to *Hygeia* during the month of December and January. The $150.00 will be divided as follows:

Group I

Auxiliaries with a membership 1 to 49...$50.00 cash

Group II

Auxiliaries with a membership 500 to 199.$50.00 cash

Group III

Auxiliaries with a membership 200 and over $50.00 cash.

A new or renewal subscription will count as one credit; a two-year subscription as two credits; a six-month subscription as one-half credit. Each group prize awarded will be based on your quota and the number of subscriptions secured. Your quota is the number of paid-up members in your Auxiliary at the close of year 1935. This arrangement gives the Auxiliary with a small membership an equal chance with the larger ones.

The time of the contest covers period from Dec. 1, 1936, to Jan. 31, 1937. All orders post-marked on and previous to Jan. 31, 1937, will be counted in this contest.

The prize money in this contest is donated by Mrs. John O. McReynolds of Dallas, Texas, one of the past presidents of the Woman's Auxiliary to the American Medical Association.

County Presidents and Hygeia Chairmen: Your County has a chance to win one of these prizes of $50.00 cash. We wish you success and sincerely hope you will start your local campaign immediately, if not already under way. Your County has already been notified of this contest, with complete rules and instructions.

Mrs. V. M. Seron,
State Chairman Press and Publicity.

A BINDER FOR THE ILLINOIS MEDICAL JOURNAL

It is now possible to secure beautiful and permanent binders for the ILLINOIS MEDICAL JOURNAL and other valuable magazines and at a very reasonable cost. Besides these can be bound in your own home or office in a few minutes thus saving the expense of shipping your magazines to a bindery. If you will write to The Suckert-Leaf Cover Company, 234 West Larned Street, Detroit, Michigan, they will be pleased to give you full details.

DR. COLWELL'S DAILY LOG PROPOSITIONS FOR PHYSICIANS. This is one of the most practical and simple systems of bookkeeping yet offered for physicians. It offers a bird's eye view of a medical man's daily financial condition. The "DAILY LOG" for physician is issued by Dr. John B. Colwell of Champaign, Illinois, published by the Colwell Publishing Company, Champaign, Illinois. This is the tenth edition of the "DAILY LOG."

For a number of years this volume has been a first aid to every busy doctor and his pocket book. Since first put out it has been subjected to yearly revisions and annotations though the general principal remains the same. "The Log" is just what its name says it is. Here is a daily financial record that is a brief, accurate, easily kept practical accounting system with daily, monthly and yearly totals, and monthly summaries and balances of income and expenses. It is *not* a ledger. To make a complete accounting system, a ledger must be run with it as the ledger is necessary for gathering together separate items of an individual account. However, this "Daily Log" is about the best thing that a busy man can have. It is easily kept by any intelligent office assistant and shows the physician the progress of his business day by day, and at the close of the year sets forth the basic figures needed for the income tax return.

Though not a clinical record there is a "Service Rendered" column for brief annotations of clinical facts.

The major changes in this 1937 edition of "The Log" are two new forms, one of these called "the Utility Record" is in answer to the demand by ear, nose and throat specialists and certain other specialists who have not found a proper form in "The Log" for particular records they wish to make. This "Utility" form is given with horizontal rulings only, and the individual doctor is expected to put in such other rulings as will make for him the form he wants. This form is found at the end of each month. The other form is our form for a record of Notifiable Diseases. Three pages are given to this form which is placed in the back of

the book immediately following the forms for the Obstetrical Records.

The "instructions for use" have been gone over carefully and revised to bring them up to date. On the inside of the heavy fly leaf in the back of the book we have listed the record blanks and physicians' supplies, which the Colwell Publishing Company has available for their use.

ROLE OF ALCOHOL IN CIRRHOSIS OF LIVER: CLINICAL AND PATHOLOGIC STUDY BASED ON 4,000 AUTOPSIES

Russell S. Boles and Jefferson H. Clark, Philadelphia (*Journal A. M. A.*, Oct. 10, 1936), states that in recent years there has been growing an increasing tendency to dispute the status of alcohol in the development of cirrhosis. It was with this in mind, especially, that the present investigation was undertaken. We wished to determine the incidence of cirrhosis of the liver, based on histologic evidence, as it occurred in a large general hospital—the ratio of age, sex and race, and, more specially, the relation borne to the disease by alcohol and the acute infections, and by syphilis, diabetes and tuberculosis. For this purpose 4,000 autopsies were studied. From an analysis of 4,000 consecutive autopsies performed at the Philadelphia General Hospital during the period from March, 1933, to July, 1935, they concluded that diabetes, syphilis, pulmonary tuberculosis and the acute infectious diseases, as well as such gross lesions in the digestive tract as ulcer, carcinoma and gall-bladder disease, do not bear any relation to the incidence of cirrhosis. It is further concluded that alcohol cannot be regarded as a specific factor in the etiology of cirrhosis. As the lesion defined as portal cirrhosis occurs under influences unassociated with alcohol, the authors would suggest abandonment of the term "alcoholic cirrhosis."

LUPUS ERYTHEMATOSUS: MODIFICATION OF THERAPY WITH GOLD COMPOUNDS

Herbert S. Alden and Jack W. Jones, Atlanta, Ga. (*Journal A. M. A.*, Oct. 10, 1936), state that as much as they would like to share Semon's prophecy and hope of 1927 that the gold compounds will in the future be as specific and efficacious in lupus erythematosus as arsenic is in syphilis, they find it impossible to do so. In all the cases herein reported they have throughout given amounts of gold that are relatively small in the light of previous reports, with results not as spectacular but comparable. They have used a prepared stable aqueous solution of gold and sodium thiosulfate which is simple in application and is given subcutaneously rather than intravenously and hence is less likely to result in accidents either from the method or from biologic phenomena. Taken as a whole the injection of gold and sodium thiosulfate subcutaneously in their cases has been free from fear of untoward reactions and simple in application and not uncomfortable to the patient, as well as efficacious in the relief of symptoms of lupus erythematosus. They believe that, all things considered, this method of giving gold salts to patients with lupus erythematosus is probably safer, more fool proof, simpler, and probably as efficacious as the intravenous route.

TERMINATION OF 1,000 ATTACKS OF MIGRAINE WITH ERGOTAMINE TARTRATE

Mary E. O'Sullivan, New York (*Journal A. M. A.*, Oct. 10, 1936), states that ergotamine tartrate administered to ninety-seven patients checked or aborted 1,042 attacks in eighty-nine of these persons. It was calculated that the individuals in this series were relieved from 39,000 hours of suffering. The earlier in the attack the medication is given, the better are the results. When used subcutaneously, the alkaloid has never failed to check again an attack in a person previously relieved if the drug was given in adequate dosage. Untoward effects of the drug may be relieved by simultaneous injection of 1/100 grain of atropine or calcium gluconate intravenously. She does not consider the drug a cure for migraine. She strongly advises against its dispensation without a consideration of the cause and prevention of the syndrome. Because of the constancy and character of the relief obtained from 1,042 headaches in eighty-nine sufferers of migraine after the administration of ergotamine tartrate, she recommends its use for the termination of these attacks and believes that the drug is a valuable addition to medical therapeutics.

WHO EATS THE TAXES?

A press dispatch from Washington December, 1933, stated that more than six million men and women are now on Uncle Sam's payroll. This meant approximately one out of every twenty persons in the United States is living off the federal government. Now add to this six million the number of persons on the payrolls of states, cities, counties, towns, school districts, etc.—that is, persons who gain their living from funds secured through taxes—and you have a fair idea of why your income is near the zero mark.

To justify this enormous payroll it will be claimed that it is a matter of emergency relief. But have these excessive expenditures been made because the people of the United States asked them, or because well organized, active, energetic and vociferous minorities urged them? Did you ask for them? Do you know of any of your neighbors who did? Your community is typical of all in this country. In truth, have not the demands for these excessive expenditures come from minorities who have imbibed freely of certain foreign theories?—*Committee on American Education.*

COOK PORK THOROUGHLY

Science for Nov. 20, gives a serious warning about more cooking fresh pork, for San Francisco in a series of 200 post-mortems gave almost one-fourth as infected. Two out of 10 specimens fresh pork sausage from first class markets gave living Trichinella. Hence the consumer must take the responsibility of prevention and more care in cooking, for meat inspection is not reliable.

Original Articles

THE CLINICAL ASPECTS OF AMEBIASIS

SAMUEL E. MUNSON, M. D.
SPRINGFIED, ILL.

It is well understood before describing the symptoms of this disease that the clinical term "Amebiasis" is the invasion of the tissues by an ameba—the Entameba hystolytica, pathogenic to man. While the term "Amebic Dysentery" is only one of the many symptoms or manifestations of the disease.

While dysenteric symptoms quite commonly accompany the infection, more particularly the severe type of the tropics, a much greater number of cases manifest only much milder symptoms which are attributed to some other disease and may thereby go unrecognized.

Because the disease was formerly described in many text-books as "Amebic Dysentery" and only thought to be found in the tropics, most physicians in temperate and cold climates were made unfamiliar with the protean manifestations of the disease itself.

As stated by Craig: "It is essential to understand the method by which the Entameba hystolytica produces the lesions in the intestines and the character of these lesions in the consideration of the symptomatology of amebiasis.

"This parasite has the power of penetrating the mucous membrane of the intestine, both by cytolysing the tissue and also by virtue of its ameboid movement, thereby reaching the submucous and muscular coats of the intestines, producing the characteristic ulcerative lesions."

These ulcerative lesions may be present without the patient having any noticeable symptoms, *either subjective or objective. Without symptoms, one may be a carrier of Entameba hystolytica, and as shown by the number of cysts excreted, indicating that thousands of amebae* are present in the intestinal tract. These lesions become invaded by numerous bacteria and the absorption of toxic substances, producing typical symptoms of low grade toxemia.

It is readily understod that any clinical classification is difficult because of the tendency of the symptoms to merge from one class into another.

According to Craig there are four classes:

Class 1: Those who harbor the parasite without any appreciable symptoms. So-called healthy carriers.

Class 2: Those who present indefinite or slight symptoms connected with the gastrointestinal and nervous systems; usually considered healthy carriers.

Class 3: Those who have attacks of diarrhea, recurring with other symptoms.

Class 4: All those that suffer from acute or chronic amebic symptoms.

The first three classes belong to the temperate and sub-tropical regions by a great majority.

Symptoms in Carriers: A postulate that seems to hold good with most of the writers on this subject—that there are no healthy carriers and that practically every untreated carrier of the parasite either has symptoms of the infection or spontaneous recovery occurs.

The symptomatology of amebiasis in carriers is largely that of the gastrointestinal tract, the circulatory and nervous systems.

Gastro-Intestinal tract: The symptoms most generally noted are constipation, disappearing attacks of diarrhea, colicky pains in lower abdomen or right iliac region, anorexia or capricious appetite, *gaseous distention of the abdomen* after partaking of food, gaseous eructations and slight nausea before eating or following meals.

Nervous System: Most noted symptoms are neuralgic pains in lower abdomen, back or legs, *dull frontal headache, sleepiness or disturbed* slumber, poor memory or inability to concentrate on work, *dull pain in muscles of legs, with* almost constant aching in lumbar region.

Circulation: The symptoms of the circulat*ing system* are irritable pulse, arhythmias, vasomotor disturbances such as skin flushing and ex*cessive perspiration of hands and feet, with* tachycardia.

The *physical signs in carriers* are underweight, sallow skin, slight anemia, irritable pulse, tenderness in right iliac fossa, distention of abdomen with frequent tenderness over the liver.

Discussion of Symptoms in Carriers: Abdominal pain or *gaseous distention:*

This pain may be referable to any of the viscera or any portion of the colon in the sigmoid or rectal region. Also frequently found

Read before Joint Session of Sections on Medicine, Surgery, Public Health & Hygiene, 86th Annual Meeting, Springfield, May 20, 1936.

in the region of the appendix or referred to the right shoulder with a diagnosis of cholecystitis.

The following cases illustrate the misinterpretation of amebic symptoms for appendicitis: (Reported by Lund & Ingam, of Boston, J. A. M. A., Oct. 1933).

Following a meeting in a hotel in Chicago of about 125 lumbermen from U. S. and Canada, June 30 to July 2, 1933, there occurred numerous cases of acute colitis and at least five deaths. The following cases, on account of being members of a special committee, had all of their food and water at this hotel for three days:

Case 1: W. B., aged 43 years. July 12, acute attack of epigastric pain, followed with nausea and vomiting. Admitted to hospital in New York. Suprapubic tenderness and pain. Absence of diarrhea or bloody stools. W. B. C. 18,000. Poly 90%. Temperature: 99.6. Following day, laparotomy was performed, with a preoperative diagnosis of appendicitis; decidedly inflamed appendix and ulcer of the cecum. Wound was closed without drainage. Examination disclosed diffuse vessel injection. Diagnosis: Acute gangrenous ulceration of the cecal wall and acute appendicitis. On account of symptoms, his abdomen was opened and explored again, wound being carefully explored in the belief that an abscess had formed. Patient developed fecal fistula; died August 4. Repeated examinations of the stools from July 19 to 26 were negative for typhoid bacilli and Entameba hystolytica. Blood agglutination test for typhoid and bacillary dysentery were also negative.

Autopsy: Ulcers of the entire large bowel; cecum and ascending colon gangrenous; microscopical examination of ulcers of the bowel revealed Entameba hystolytica.

Case 2: Report of a man taken sick on July 28: died on Aug. 24. Cause of death: Right, sub-phrenic abscess.

Case 3: M. E. R., from Seattle Lumber Company. August 28, had exploratory laparotomy and appendectomy. Died on Sept. 5.

Autopsy: Encapsulated cavity in liver, filled with dirty, grayish material. There was found non-motile Entameba hystolytica.

Case 4: Lumberman from Louisiana. Had indigestion July 14. Stools were examined for ameba but negative. Had positive agglutination test for dysentery and was given serum. Died August 2 of peritonitis. No autopsy performed.

Case 5: Member of Louisiana lumber company. Died of acute colitis, three weeks after Chicago meeting. Amebic dysentery suspected.

Abdominal distention has been mentioned as one of the most common symptoms noted in carriers, following eating, and lasting for several hours, usually occurring after partaking of any unusual food which would not occur in a normal individual.

Constipation is rather the rule in carriers and may alternate with slight attacks of diarrhea.

Diarrhea: There may be considerable mucus, more rarely slight amount of blood. Attacks frequently occur at night with copious stools. Motile trophozoites of Entameba hystolytica are present with precystic and cystic forms, occurring as the stools begin to be formed. Others may have regular daily bowel movement, semi-formed with small amount of mucus.

Disturbance of Appetite: Patient may have ravenous appetite, or vary with every symptom of gastritis to complete anorexia.

Loss of Weight: A notable symptom. When found in a young person, will become quite normal when successfully treated.

Headache: Mostly of the frontal type. May be persisting, occurring at some time day or night. Disturbed slumber is frequently noticed. Many individuals fall to sleep during the day and evenings after meals.

Memory Impairment: The physician oftimes makes a mistaken diagnosis of neurasthenia or exhaustion, advising a vacation from work and worry.

Neuralgic Pain: These may be noticed in the lower abdomen or lumbar region.

Fever: May be noticed in late afternoon, one or two degrees, probably due to absorption from toxic material from bacterial invasion. Subnormal temperatures may occur during mornings, with palpitation from weak heart action.

Tenderness Over the Abdomen: As stated before, there is no doubt that many individuals are needlessly operated upon in the belief that the amebic patient was suffering from chronic appendicitis.

Gall Bladder: Some authorities believe that there is a form of cholecystitis caused by an invasion of Entameba hystolytica. In one case that came to a clinician of Chicago, a diagnosis of Entameba hystolytica infection was made by finding the parasite in a Lyons' drain.

As stated by Craig: He is convinced "that a considerable portion of patients that crowd our gastroenterological clinics, complaining of vague and indefinite symptoms connected with the gastrointestinal tract, and we are unable to arrive at a diagnosis, are really carriers of Entameba hystolytica."

The absence of diarrhea does not preclude the absence of the parasite. Hence the importance

of routine stool examinations, particularly where there is a history of any gastrointestinal symptoms.

Symptomatology of Amebic Diarrhea or Enteritis: Same conditions as mentioned as occurring in carriers, but with the addition of recurring attacks of diarrhea lasting for several days or weeks.

All symptoms mentioned as noted in the carrier are much more pronounced—sallowness of the skin, presence of abdominal colic, with tenderness and loss of weight.

Stools have more mucus and are mushy, with the passage of much gas. These attacks may last three or four days or continue for two or three weeks. This may be unaccompanied by any blood. These stools, microscopically, contain a few leukocytes, intestinal epithelium and a few red corpuscles, with the motile trophozoites of Entameba hystolytica.

A daily rise of temperature and a leukocytosis of over 12,000 per cu. mm. should lead to careful examination. With tenderness over the liver one should think of beginning liver abscess.

The Incubation Period: Walker and Sellards experimented with 20 men who volunteered; 17 became parasitized. From the time of the feeding and the occurrence of the ameba in the stools, it was one to four days. Four men developed symptoms of acute dysentery. Average time was 64.8 days.

In the recent Chicago epidemic the incubation period was very short in most cases—as early as four days after the exposure. Such short period is rarely observed in those with dysenteric symptoms. It is inferred in these short periods of incubation that there must be enormous dosage of cysts ingested by the exposed individuals.

Symptomatology of Acute Dysentery: In the acute type of dysentery there is much variation in the severity of the symptoms, from those cases where only a few blood stained stools are passed without marked symptomatology, to those in which death occurs from the fulminant gangreous types in a few hours.

In the tropics and sub-tropics the latter type, or severe type, are more frequently found than in the temperature zones.

The onset of amebic dysentery may be abrupt, or occur with an attack of diarrhea. Nausea or vomiting may be present, accompanied with general malaise and severe headache.

These symptoms may be preceded by severe colicky pains with desire to defecate. The stools may be solid at first, followed in a short time by semi-fluid or fluid stools and contain much mucus streaked with blood.

Where the diarrhea continues for several days, marked tenesmus, with great discomfort to the patient is noticed. The stools may consist of almost pure mucus and blood.

A characteristic, offensive, musty albuminous odor may be noticed by those who have much experience with these cases.

Average number of stools are from 15 to 20 a day. For the first few days the prostration may not be as great as in bacillary dysentery.

Fever: May be present, ranging from 100 to 101; in milder cases from 99 to 100.

Where the cases are of the more mild type and less frequent stools, the patient may continue about his occupation without having suspicion of the cause of his condition.

(To Illustrate an *Acute Case*)

Case of V. F.: Age, 30 years. Occupation, traveling salesman. Came for examination and consultation, Jan. 20, 1934. Had been traveling in and out of Chicago, beginning in October, 1933, stopping at Strand Hotel Oct. 27; Auditorium Hotel, Oct. 28-31; back at the Strand Nov. 3-5. In Milwaukee, Nov. 6-17. Continued to be in and out of Chicago, also visiting St. Louis, until about the time he was seen here in January. Had been living in Springfield about a year.

Family History: Negative. Married; wife in good health; no children.

Past History: At one time had slightly increased B. P., but with diet this improved and had no further trouble. No other history of any consequence.

Present Symptoms: First noticed blood in stools November 10, 1933, and present every day since. Bowels move five to six or more times a day; often without any feces, but only blood and mucus. Bloody mucus particularly in first portion of stools, but present in all the stools. More noticeable mornings and evenings than during the day. Stools soft and ragged; never well formed. Taking mineral oil almost every day. Has heavy feeling in epigastrium and when he presses over this region he feels sore. Appetite not good; eats only from habit. Eats at hotels and restaurants except when home on Sunday. Smokes cigarettes to excess. Sleep not good since symptoms began; not able to get to sleep on account of pain in lower bowel and desire to have bowel function. Has some soreness in elbow and right knee.

Physical Examination:

Appearance: Strong, rugged appearance; height, 6 ft., 1 in.; weight, 197. Skin sallow, with slightly undernourished appearance.

Abdomen: Negative except soreness over lower part.

Rectal: No appearance of ulcers of rectum or inflammation of mucous membrane.

Laboratory: Urine: Trace of sugar. *Blood count:* Hemoglobin 90. W. B. C. 13,600. *Kahn:* Negative. *Feces:* Occult blood, positive, 4 plus. Parasites of Entameba histolytica positive.

Severe Types of Dysentery: All the symptoms in the less severe types are observed, but with much more sudden onset, with sloughs of intestinal mucous membrane with offensive odor.

Temperature range is 101 to 103.

Leukocytosis is much higher, even 25,000 to 30,000. After a few days of delirium the patient succumbs from cardiac failure or one of the many other complications.

It is highly probably, as mentioned by Craig and others, that these severe cases of amebic dysentery are mixed types of infection with bacillary dysentery or complicated with some secondary bacterial infection.

Symptoms of Chronic Amebic Dysentery: The majority of acute cases usually improve for longer or shorter intervals, with reoccurring attacks, having periods of constipation with intervals of diarrhea in which much mucus and blood is observed. This condition may continue for weeks and months and is usually called the sub-acute amebic dysentery.

As these events follow along with regular sequence, this is now called the chronic form. Some of these patients may become invalids, confined to the chair or bed.

(To Illustrate a *Chronic Case*)

March, 1921.

Case of A. C.: When attempting to rise in the night, became very dizzy. Sugar and diacetic acid found in urine next day.

Previous History: Four years ago was confined to his room for few days and home for a week, on account of frequent bowel movements. Was seen by a physician and treated for bleeding piles. No discomfort in abdomen. Very dizzy at that time.

Examination: Physical findings negative. B. P. variable but generally low. Laboratory: Kahn negative. Urine: Sugar and diacetic acid present, but disappeared after about 10 days with diet.

Later Symptoms: September, 1924. Patient continued well after March, 1921, but returned in September, 1924, complaining of dizziness and insomnia. Urine negative. In December, 3 months later, complained of soreness and distention in bowels; worse toward evening; had been passing some blood from bowels, with great amount of gas, with pain across lower abdomen. R. B. C. normal. W. B. C. 7,000. Patient thought he had a reoccurrence of his piles, but examination disclosed no indication of this.

Examination of Stools: (Dec., 1924). Occult blood, positive. Parasites and ova not found. Pus cells, two plus. T. B. not found.

An examination of the stools was made again on the following day, with the suggestion to the laboratory technician that the patient had either T. B. of the rectum (not probable because of negative x-ray of chest), or ameba coli. With this suggestion, further examination revealed active entameba hystolytica positive, two plus.

This patient was put to bed under the care of a nurse, and given intensive treatment with emetine hydrochloride and large doses of ipecac, controlled with opium.

This treatment was followed by neoarsphenamine, intravenously.

During this time this patient had intermittent glycosuria, and on account of the appearance of glycosuria, it was thought he also had interstitial pancreatitis and hepatitis, both due to infection of entameba hystolytica.

Blood findings continued about the same. At no time was there a leukocytosis.

Cysts were found in the stools under this treatment until in June, after which time he was put upon an arsenical preparation—stovarsol, as recommended by Dr. Johns, of New Orleans.

After the course of this treatment, the stools became entirely negative to any of the cysts and the patient, under observation, became entirely well.

This patient passed out from under my care, but I understood ten years later he had a recurrence.

It is during this chronic period that the many complications mentioned may arise, only to be found upon post-mortem examination, unsuspected and only too often mistaken for some other disease.

If recognized and treated for a long period, the diarrhea may not be controlled, due to the loss of the mucous membrane over large areas of the intestines, from ulceration and replacement by masses of dense fibrous tissue.

Blood Picture: (In the Chronic Types). In the chronic types, symptoms of secondary anemia may develop, as simulating pernicious anemia. This may be mild or severe. Where the condition has not existed for a long time, the blood count may be found between 3½ to 4 million red cells. Where the disease persists for a longer period, with severe complications, red cells are found even lower than this.

Where the leukocytes are found above 12,000, abscess in the liver or elsewhere in the body should be considered.

Where there is secondary involvement, with streptococcus, the leukocytes may range very high—30,000 or more.

In all the long-standing cases, particularly where process of digestion is impaired, the hemoglobin drops from 15 to 30%.

In these chronic types, with complications, instead of the sallow complexion, as the patient becomes more emaciated and weak, the skin takes on a grayish pallor and the patient appears pale and haggard, with general appearance of serious condition.

Death: Caused by exhaustion, abscess of the liver, broncho- or lobar pneumonia, subphrenic abscess, empyema, abscess of the spleen or the brain, rupture of the bowel, appendicitis—with accompanying symptoms of these organs.

CONCLUSIONS

1. On account of the prevalence of amebiasis, it has become a public health problem.
2. On account of this prevalence, estimated from 5 to 10%, every physician should familiarize himself with the symptoms of both the dysenteric or acute form, and with the latent and cystic form.
3. A campaign of education as to the incidence of amebiasis, that prophylactic measures may be put into effect in every household to guard against this disease.
4. The examination of all food handlers, not only in hotels and restaurants, but of roadside eating places, which have multiplied a thousand times since the hard roads of the country and travel by automobile.

416 Ridgely Bank Building.

LABORATORY METHODS FOR THE DIAGNOSIS OF AMEBIASIS

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CHICAGO

1. Definition.
2. Differential characteristics of the Intestinal Amebae of Man:
   - A. *E. histolytica*
     - a. Trophozoites
     - b. Precysts
     - c. Cysts
   - B. *E. coli*
     - a. Trophozoites
     - b. Precysts
     - c. Cysts
   - C. *Endolimax nana*
     - a. Trophozoites
     - b. Precysts
     - c. Cysts
   - D. *Iodameba bütschlii*
     - a. Trophozoites
     - b. Precysts
     - c. Cysts
   - E. *Dientameba fragilis*
3. Diagnostic Procedures:
   - A. Character of stool and collection of specimen
   - B. Examination
     - a. Active cases
     - b. Convalescent cases, and carriers
     - c. Pus from liver and lung abscesses
     - d. Procedures for fixing and staining
     - e. Concentrating stool for cysts
     - f. Cultural methods
     - g. Complement fixation
   - C. Illustrations

Presented before the Joint Session of Sections on Medicine, Surgery, and Public Health and Hygiene, 86th Annual Meeting of Illinois State Medical Society, May 20, 1936.

1. *Definition.* "Amebiasis is the state of being infected with amebae. In practice it refers to *E. histolytica.*" Dobell.

"*Amebiasis* is the invasion of the tissues of man by ***E. histolytica.*** The invasion is primarily through the mucous membrane of the large bowel —much more rarely through the mucous membrane of the ileum.

"*Amebic Dysentery* is a bloody mucoid diarrhea caused by *E. histolytica* and occurring as one of the manifestations of amebiasis." Craig.

2. DIFFERENTIAL CHARACTERISTICS OF THE INTESTINAL AMEBAE OF MAN

The main criterion upon which the differences are based is largely the nuclear structure which involves the thickness of the nuclear membrane, size, type, and position of the karyosome, linin network (delicately stained fibrils in spaces between the karyosome and the nuclear wall), and chromatin granules. In addition to the nuclear structure, various other features are important —the number and type of nuclei, the type of chromatoid bodies, and the glycogen.

A. *E. Histolytica*

E. histolytica is divided into different races according to the size of cysts produced (Plate 1, Figs. 1-18). (Plate 2, Figs. 19-29).

Trophozoite—15-80 microns.

E. histolytica which produces small variety cysts are usually smaller and not quite as rapidly motile as those producing large variety cysts. In the cases which we have had we have never

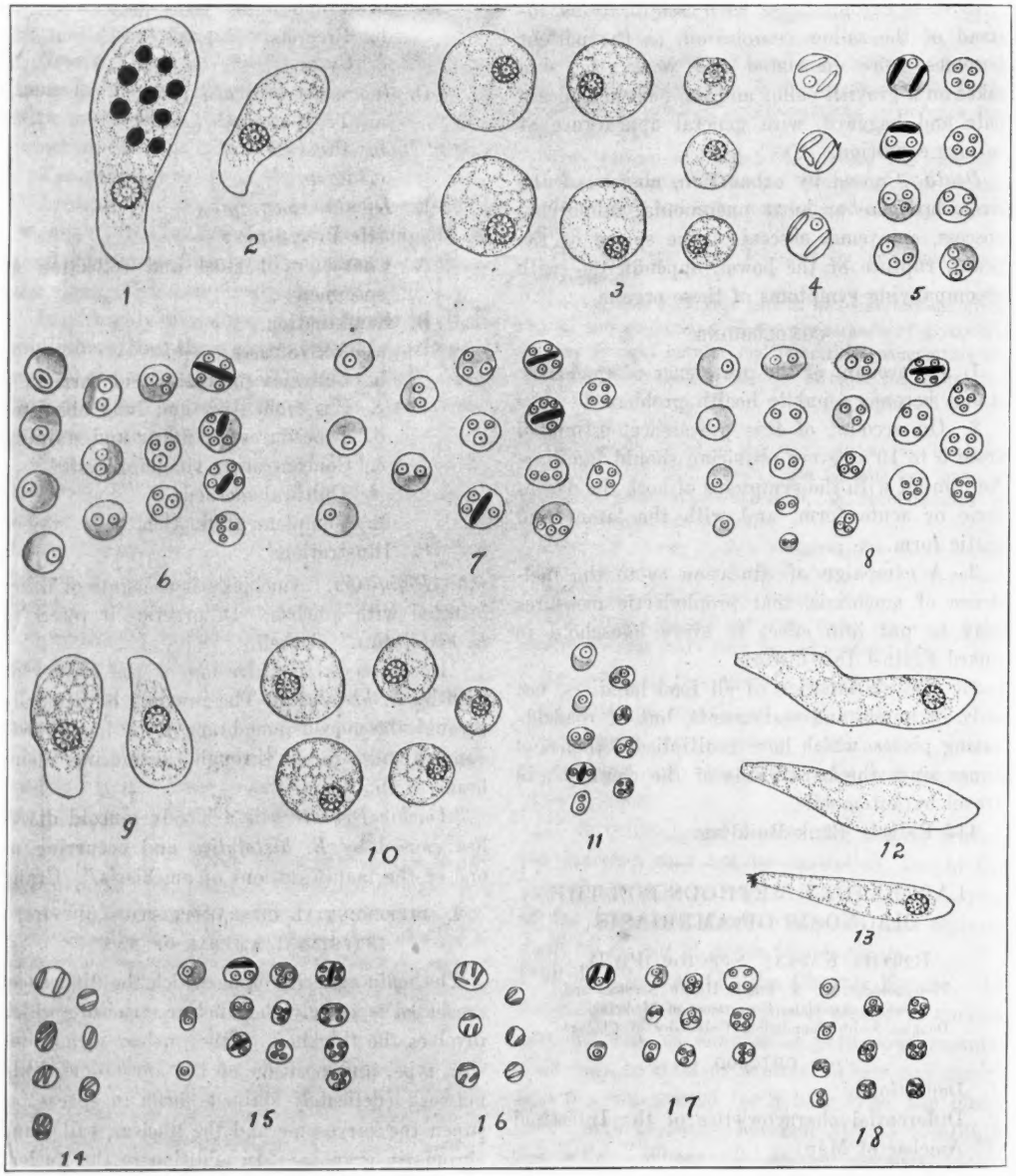

Plate 1.

NOTES EXPLAINING THE DRAWINGS

Most of the drawings were made from moist preparations (saline, water and iodine) of fresh material, with a camera lucida, using a number 10 eye piece and a high, dry, 1/6" objective. (Bacteria, crystals, yeast cells, starch grains, red blood cells, karyosomes, chromatoid bodies, and chromatin granules have been filled with India ink in order that they may show up better.) The oil immersion lens was used in making drawings from sections of tissue and from iron-hematoxylin preparations.

Plate I, Figures 1-8 E. histolytica (Large variety, except for few small cysts, Fig. 8); Figures 9-18, small variety.

Fig. 1. Trophozoite, showing the nucleus and red blood cells (from a bloody mucous stool of an active case, M). (Red blood cells, chromatin granules, and karyosome filled in with India ink to show up better.)

Fig. 2. Trophozoite passing into the precystic stage (water preparation.)

Fig. 3. Precysts of various sizes (water preparation).

Fig. 4. Young cysts (water preparation) showing typical

been able to find red blood cells in the trophozoites which gave rise to small variety cysts. Bloody mucous stools from acute cases of amebic dysentery usually show quite large *E. histolytica* trophozoites; whereas the trophozoites found in soft stools from mild cases of amebic dysentery are usually smaller in size approaching in size those which give rise to small variety *E. histolytica* cysts.

Cytologically the trophozoites have clear, glass-like ectoplasm and finely granular endoplasm. The motility is usually in a straight line by means of a single large blade-like pseudopodium which moves rapidly and explosively. Usually the nucleus flows into the pseudopodium first, the red blood cells and the finely granular material follow the nucleus into the pseudopodium. In fresh, bloody mucous stools (from acute cases of amebic dysentery) the motility is very rapid. In old stools the motility is more sluggish and the pseudopodia are blunt blade-like.

Precysts.—Before encystment the organism becomes round or slightly oval, hyaline (by ridding itself of ingested material), smaller in size, and loses motility completely or it may continue to send out very small blunt pseudopodia. The nucleus consists of a delicate wall lined internally with a ring of small refractile chromatin granules. In the center of the nucelus is a small karyosome. The precyst secretes a delicate wall and encysts.

Cystic stage.—Size 5-20μ (small variety, 5-12μ; large variety, 12-20μ)—The cysts contain 1-4 nuclei, although as many as 8 have been described. The nuclei have characteristic structures—thin nuclear membrane composed of fine granules of chromatin and a very small centrally placed karyosome.

Young cysts have typical chromatoid bodies —rods with blunt ends. These show up best in moist preparations. In iodine stained preparations, brown staining glycogen may be seen. Both the chromatoid bodies and the glycogen disappear when the cysts are old.

B. E. COLI: (Plate 2, Figs. 30-32)

Trophozoite.—The trophozoites vary in size from 15-50μ, the average size being about 20-25μ. As a rule there is no differentiation between the ectoplasm and the endoplasm. There are many food vacuoles containing ingested material—bacteria, crystals, starch grains, pus cells, yeast cells, flagellates, and *E. histolytica* cysts. The organism moves sluggishly in one direction for a short distance, halts, produces a pseudopodium from another portion of the body, and moves in another direction, chiefly by changing its shape. Occasionally one encounters very motile *E. coli* which may be confused with *E. histolytica*. In such an event careful examination will reveal ingested debris, bacteria, etc., which does not usually happen with *E. histolytica*. In case of doubt, stained preparations should be made, using the iron-hematoxylin method and the nuclei should be studied carefully. Repeated direct stool examinations should be made, as well as cultures.

Cytologically, the organism contains a visible nucleus surrounded by a thick membrane composed of coarse chromatin granules. The karyosome is fairly large and usually to one side of the center. Chromatin granules are present in the clear zone between the karyosome and the nuclear membrane.

Precystic stage.—15-30μ—In this stage it is frequently difficult to differentiate *E. histolytica* from *E. coli*. As a rule, however, *E. coli* has a thicker wall, the cytoplasm is more granular, and the chromatin granules are coarser.

Cystic stage.—10-30μ (average size 14-20μ)—The cysts of *E. coli* have fairly thick walls. There are 1-8 nuclei (16-32 have been described). We have seen 12-16 nuclear cysts.

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chromatoid bodies and nuclei. (Figs. 3 and 4 are from case M. M.).

Fig. 5. *E. histolytica* cysts, large variety (iodine preparation) showing nuclei with karyosomes, chromatoid bodies and glycogen. (Case M.).

Fig. 6. *E. histolytica* cysts—large variety, case R. (iodine preparation).

Fig. 7. *E. histolytica* cysts, large variety (iodine preparation) showing nuclei with karyosomes, chromatoid bodies and glycogen (Case M. M.).

Fig. 8. Large intermediate, and small *E. histolytica* cysts, case C. M. (iodine preparation).

Fig. 9. Trophozoite showing nuclei (water preparation).

Fig. 10. Precysts (water preparation).

Fig. 11. Cysts, (iodine preparation).

Fig. 12. Trophozoites from a 24-hr. culture (case H. Sch. same as Figs. 9, 10, and 11).

Fig. 13. Trophozoite from a 24-hr. culture from case R.

Fig. 14. Small and intermediate cysts (water preparation) showing chromatoid bodies and nuclei (case R. G.).

Fig. 15. Small and intermediate *E. histolytica* cysts (iodine preparation) same as case in Fig. 14).

Fig. 16. Small and intermediate *E. histolytica* cysts (water preparation). From case Wm. L. J.

Fig. 17. Intermediate and small *E. histolytica* cysts (iodine preparation) from same case as Fig. 16.

Fig. 18. Very small and intermediate cysts of *E. histolytica* (iodine preparation) same case as Figs. 16 and 17.

The karyosome is usually large and eccentric. The chromatoid bodies are needle- or splinter-like, with sharply pointed ends. Glycogen is present in young cysts. In the single nuclear

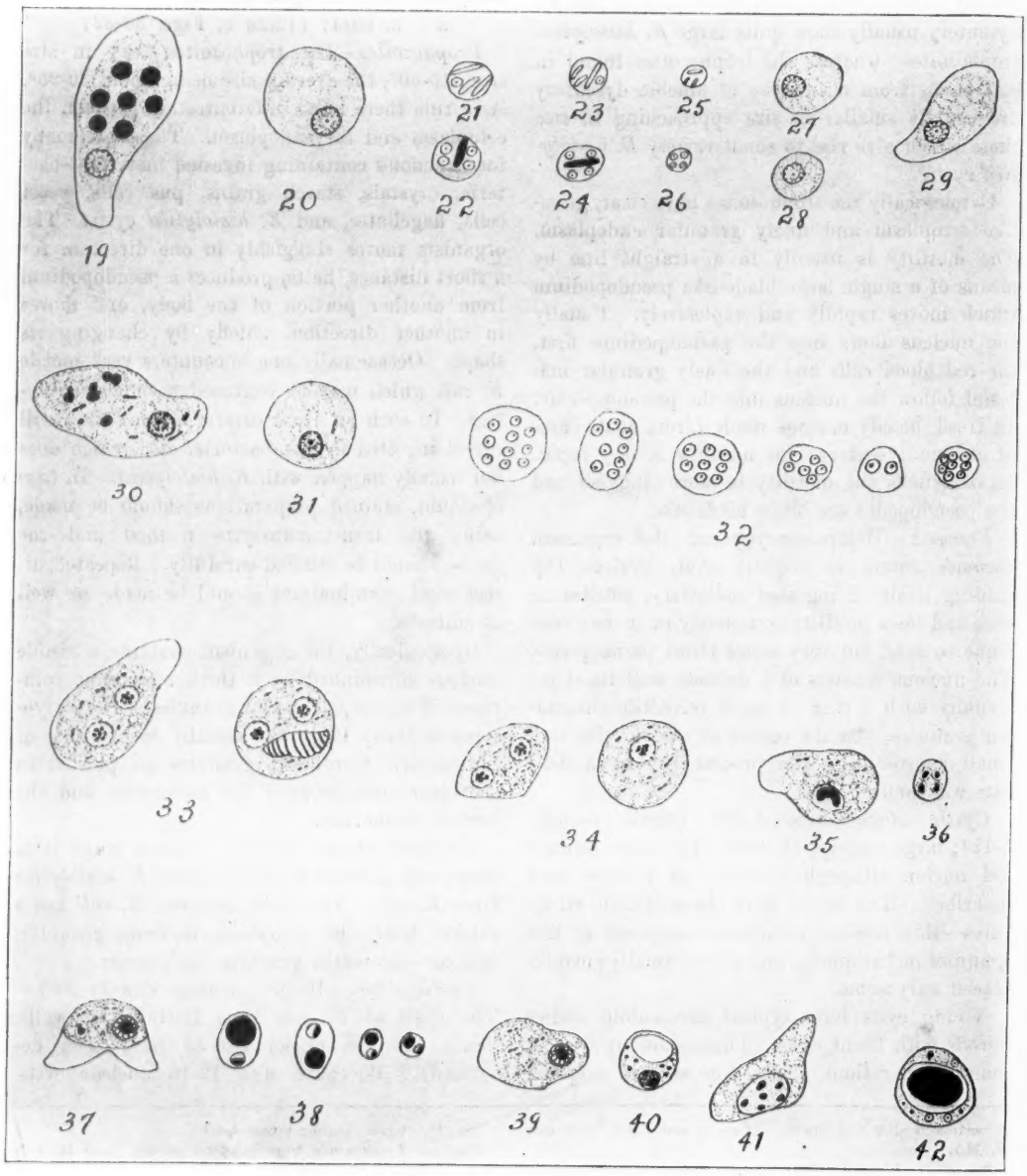

Plate 2.

PLATE 2

Fig. 19. *E. histolytica* trophozoite from a bloody mucous stool.

Fig. 20. *E. histolytica* precyst (water preparation).

Fig. 21. *E. histolytica* cyst, large variety (water preparation).

Fig. 22. *E. histolytica* cyst, large variety (iodine preparation).

Fig. 23. *E. histolytica* cyst, intermediate size (water preparation).

Fig. 24. *E. histolytica* cyst, intermediate size (iodine preparation).

Fig. 25. *E. histolytica* cyst, small variety (water preparation).

Fig. 26. *E. histolytica* cyst, small variety (iodine preparation).

Figs. 27, 28 and 29. Large precyst, small precyst, and trophozoite from a specimen showing small variety *E. histolytica* cysts.

Figs. 30-32. *E. coli:*

stage the nucleus is large, becoming progressively smaller with the increase in the number of nuclei.

C. *Endolimax nana* Wenyon and O'Connor, 1917 (1918)

(Plate 2, Figs. 35 and 36)

Trophozoite.—8-15μ—The cytoplasm is granular, containing food vacuoles filled with bacteria, yeasts and debris. The motility is by means of short, blunt, hyaline pseudopodia, which are thrown out and withdrawn slowly. In fresh material or in cultures the motility may be by means of slender, finger-like pseudopodia. The nucleus has an indistinct wall without chromatin granules. The karyosome is large and irregular.

Precystic stage.—In unstained preparations it is refractile, round or oval. The cytoplasm is free from vacuoles, bacteria, and debris.

Cystic stage.—5-12μ—In unstained preparations the cysts appear as refractile, colorless, round or oval bodies containing 1-4 nuclei. In stained preparations the characteristics stand out plainly—there are 1-4 nuclei with faint nuclear membranes and no chromatin granules. There is a large central or eccentric karyosome in each nucleus. Glycogen is rarely seen.

D. *Iodameba bütschlii* von Prowazek, 1912; Dobell, 1919 (Plate 2, Figs. 37-40)

Trophozoite.—5-20μ or larger (average 10-15μ)—It is a small ameba moving sluggishly, as a rule, by means of broad, round, and hyaline pseudopodia. In living trophozoites the nucleus is frequently invisible. In well stained preparations however, the small nucleus (2-3.5μ) with its large central karyosome, shows up well. The nuclear membrane is usually achromatic. Between the karyosome and the nuclear membrane is a zone filled with granules. When the preparation is well stained the linin network (between the karyosome and the nuclear membrane) shows up. The cytoplasm is homogeneous and finely granular, containing food vacuoles filled with bacteria, crystals and various debris.

Precystic stage.—In this stage the organism is free from food vacuoles; it appears clear, glassy white and contains a large nucleus. It rounds up, secretes a cyst wall and encysts.

Cystic stage.—6-20μ (average, 9-12μ)—There is a great variation in shape of the cysts; round, oval, rhomboidal, etc. There are one or more glycogen masses staining from pale to mahogany brown with iodine. Other inclusions appear giving staining reactions of volutin. Usually there is only one nucleus, rarely two. The nucleus differs in that the granules are massed at one pole and the karyosome is pressed toward the wall, producing a "signet ring" appearance.

E. *Dientameba fragilis* Jepps and Dobell, 1918

(Plate 2, Figs. 33 and 34)

Trophozoite.—Usually described as being small, about 12μ, but they may be quite large, as large as *E. histolytica*. The organism moves rapidly by means of flattened, leaflike, hyaline pseudopodia. There is differentiation between ecto- and endoplasm. The cytoplasm may be finely or coarsely granular, containing food vacuoles filled with bacteria, yeast cells, starch grains, etc. The most important diagnostic feature is the presence of two nuclei. On dividing, the organism results in two uninnucleate individuals, the nuclei of which divide, resulting in binucleate organisms. The nuclei are bounded by fine membranes. The karyosome is usually in the center, but may be at one side of the nucleus. The karyosome is composed of granules, usually only four large, deeply stained, chromatin granules.

3. DIAGNOSTIC PROCEDURE

All stools should be collected in clean, dry containers, free from disinfectants. Oil, bismuth, barium, and medications render the stools undesirable. All stools should be examined as fresh

Fig. 30. Trophozoite (water preparation).
Fig. 31. Precyst (water preparation).
Fig. 32. Cysts of various sizes and number of nuclei (iodine preparation).
Figs. 33 and 34. *Dientameba fragilis:*
Fig. 33. Trophozoites from saline preparation.
Fig. 34. Trophozoites from iron-hematoxylin stain.
Figs. 35 and 36 *Endolimax nana:*
Fig. 35. Trophozoite (iron-hematoxylin stain).
Fig. 36. Cysts (iron-hematoxylin stain).
Figs. 37-40. *Iodameba bütschlii:*
Fig. 37. Trophozoite (water preparation) showing pseudopodia.
Fig. 38. Cysts (iodine preparation).
Fig. 39. Trophozoite (iron-hematoxylin stain).
Fig. 40. Cyst (iron-hematoxylin stain) showing nucleus, glycogen vacuole and volutin granules.
Fig. 41. Macrophage from a section of an amebic ulcer of the bowel.
Fig. 42. Blastocystis hominis. (It is a vegetable organism, a non-pathogenic fungus, about 5-40 μ (micron) in diameter. It may be oval or spherical with a narrow band of cytoplasm containing refractile granules and one or more round or oval nuclei surrounded by a delicate membrane. Dividing forms, seen so frequently in cultures, have an hour glass appearance due to the constriction near the center of the cell).

In hemotoxylin stained preparation the narrow band of peripheral cytoplasm is unstained and contains well stained nuclei with large deeply staining karyosomes.

as possible. Soft and bloody mucous stools should be examined immediately or as soon as possible and should never be left over night.

No person should be pronounced negative until six stools have been examined on different days. Some of these stools should be obtained normally, and others following the administration of salt. In choosing material for examination, any part of the homogeneous stool and every part of the heterogeneous stool should be examined.

The macroscopic appearance of the stool is significant—whether it is hard, soft, liquid and whether it contains blood, pus and cellular exudate. A soft stool, intimately mixed with blood and mucus, containing pus and cellular exudate, is much more indicative of bacillary than of amebic dysentery (F. W. O'Connor), whereas bloody, mucous stools are highly suspicious for amebic dysentery.

Balantidial dysentery due to *Balantidium coli*, a ciliate, is indistinguishable clinically from amebic dysentery. The differential diagnosis must be made by finding the etiological organism.

In alcoholic diarrhea the stools simulate those in amebic dysentery in appearance, but persistent examinations of the stools fail to reveal *E. histolytica* and the patient gets well after several days' rest in bed.

In syphilitic ulcerations of the rectum, the stools may be diarrheal or semi-solid, containing mucus and shreds of tissue. The positive Wassermann test is of diagnostic importance here.

Tuberculous ulceration of the bowel, a common complication of pulmonary tuberculosis, is associated with frequent stools containing mucus and small amounts of blood, except shortly before death, when massive hemorrhages may occur. Finding tubercle bacilli in the stools is of no great importance because a patient with pulmonary tuberculosis may swallow some tubercle bacilli in the sputum.

In chronic mucous colitis there are mucous casts and no blood in the stools. Nonspecific ulcerative colitis, on the other hand, is associated with frequent stools containing pus, blood, and small amounts of cellular exudate.

In malignant diseases of the bowel the stools are frequent and contain much pus and blood (frequently chocolate in color). The differential diagnosis is based on the laboratory findings, proctoscopic examination, and x-ray findings.

However, whatever the appearance of the stool, a careful examinatin of at least 4-6 smears should be made before pronouncing it negative. If anything suspicious is seen, a very careful examination should be made, making as many smears as may be necessary. If no decision can be reached, repeated stool examinations should be made by direct examination, by culture, and iron-hematoxylin preparations if necessary.

EXAMINATION

(a) *Bloody mucous stools from active cases of amebic dysentery.*—Specimens may be obtained with the proctoscope on proctoscopic examination, by means of a rectal tube, by inserting a glycerin suppository, or normally. A tiny granule of bloody mucus is chosen, placed on a slide, covered with a cover slip and examined under low power first and then under high dry for active *E. histolytica* with red blood cells in them. If the stool should contain fecal material it should be diluted first with a little warm saline to the proper consistency. This is done by placing a drop of warm saline on a slide, a little of the stool is taken on an applicator or needle and emulsified (mixed well) to reading opacity in the drop of saline covered with a cover slip, and examined as above. The diaphragm of the misroscope should be closed as much as possible.

(b) *Examination of stools from convalescent cases and carriers.*—As the diarrhea of the active cases of amebic dysentery subsides following medication, or spontaneously, the feces remains longer in the large bowel, the active amebae lose their motility and begin to round off, giving rise to precysts. The precysts of *E. histolytica* are 20-30μ in diameter, hyaline in appearance, and are free from granular material, or contain only very fine granular material (the remains of the red blood cells). The nucleus is typical, containing a small central karyosome, and is bounded by a fine membrane composed of fine chromatin granules. In this stage it is sometimes difficult to diagnose *E. histolytica*. Such stools may be cultured (on liver infusion, agar overlaid with serum, saline described later), whereupon the precysts vegetate, giving rise to typical *E. histolytica* trophozoites. If difficulty is still encountered, the examinations should be repeated on normal stools as well as those follow-

ing salts. Iron-hematoxylin preparations might also be made and examined for typical *E. histolytica* with the oil immersion lens.

As the stools remain longer in the large bowel they become more formed and the amebae encyst, giving rise to cysts containing 1-4 nuclei.

Formed stools from convalescent cases or from carriers should be examined with warm water or saline as well as with iodine. (The iodine solution should be fresh—a 1% aqueous solution of iodine in 2% potassium iodide, or an aqueous solution of 5% potassium iodide saturated with iodine and diluted with an equal part of distilled water for use. This should be kept in a brown bottle and away from the light, or a card may be wrapped around the bottle to keep the iodine solution from disintegrating.)

In making smears a drop of saline or water is placed on a slide. In this is emulsified a small amount of feces, with a needle or applicator, to reading opacity, covered with a cover slip, and examined first with the low power and then with the high dry (some people prefer to use the oil immersion lens). In such smears may be seen flagellates, amebae, ova, larvae of such worms as *Strongyloides*, etc. In young cysts the chromatoid bodies show up very clearly in the water or saline preparations. Several smears of each specimen should be examined with saline or water, as well as with iodine. In the iodine preparations iodine instead of water or saline is used and smears made and examined exactly the same as above. The iodine kills the protoplasm and stains the cytoplasm more or less yellow, the cyst and nuclear walls dark, and the glycogen dark brown. As a rule, the karyosomes stand out as refractile bodies. Thus one can study the number and type of nuclei, thickness of the cyst wall, type and position of the karyosome, etc. Iron-hematoxylin permanent preparations are unnecessary unless finer details are desired to study.

(c) *Examination of pus from liver and lung abscesses.*—In examining pus from liver and lung abscesses one should look for active *E. histolytica*, for they do not encyst in pus. *E. histolytica* are found in the walls of abscesses and not in the central necrotic material, so that care should be taken to procure material from the walls of such abscesses in examining for *E. histolytica*.

In case of doubt as to the diagnosis of an intestinal protozoan, or if permanent preparations are desired for other reasons, the following method has been found to work the best: The material should be perfectly fresh, properly fixed, and at no time in the process should the slide or cover slip preparations be permitted to dry; as soon as that happens the preparations are ruined and should be discarded. Bloody mucus or soft stools need not be diluted, but hard stools should be diluted with saline before making smears. Smears may be made on slides or cover slips, using an applicator. Smears should be uniform and not too thick. If slides are used, the fixing fluid should be placed in staining jars. If cover slips are used, the fixing fluid is placed in Petri or evaporating dishes. Smears of the proper thickness are made and the cover slips are immediately dropped film side downward into the fixing fluid and are permitted to float for a few moments, then they are picked up with forceps and completely immersed face upward, using plenty of fixative and discarding it when through.

(d) *Procedure for Fixing and Staining*

(Iron-hematoxylin Method)

Fixing solution—Schaudinn's solution

Saturated solution of mercuric chloride in distilled water .....2 parts
95% alcohol .....1 part
To every 100 c.c. of this mixture add 2-5 c.c. glacial acetic acid.
Fix 10-20 minutes (30 minutes is better for cysts).

Wash and harden

50% alcohol for a few minutes.
To remove fixative 70% alcohol to which a few drops of iodine solution (alcoholic) has been added for at least 10 minutes.
The iodine removes the remaining $HgCl_2$.
95% alcohol (best for an hour or several days).

Hydrate

70% alcohol for a few minutes.
50% alcohol for a few minutes.
30% alcohol for a few minutes.
Distilled water.

Stain (Iron-hematoxylin method)

Mordant by placing in 2% aqueous iron alum (ammonium ferric sulphate) 2-6 hours.
Wash in distilled water for a few seconds.
Stain in 0.5% ripened solution of hematoxylin in distilled water 6-24 hours. (Make up solution, place in flask, plug with cotton wool, place in a warm place—in the sun, if possible—shaking from time to time. When the solution is "ripe"—a good brown color, namely, the hematoxylin is more or less oxidized to hematein, it is ready for use. This may require several weeks.)
Wash in distilled water.

Differentiate in 0.5 to 1% aqueous iron alum (never permitting the preparation to dry during the process.) Remove a slide, rinse in distilled water, and examine under the microscope for proper differentiation; the cytoplasm should be gray; the cyst, nuclear walls, as well as the chromatoid bodies and karyosomes, should be black when properly decolorized.

Wash in distilled water.

Then in running tap water for at least ½ hour in order to wash out all the alum; otherwise, the decolorization will continue.

Wash in distilled water.

Dehydrate

50% alcohol 5 minutes.

70% alcohol 5 minutes.

95% alcohol 5 minutes.

Absolute alcohol 10 minutes, 2 changes.

(Absolute alcohol and xylol, 50-50, 5 to 10 minutes.)

Clear (Xylol 5 minutes)

Mount in balsam.

(e) *Concentrating stools for cysts.*—A number of methods may be used in concentrating specimens for cysts when these are present in small numbers. One method is to take a small piece of the stool, emulsify it well in water or saline, strain through two layers of gauze, centrifuge at low speed 2 or 3 minutes, pour off the supernatant fluid, emulsify the sediment as before, and repeat the washing 2 or 3 times. Examine the final sediment with water and iodine. The small variety cysts fail to settle to the bottom.

(f) *Cultural methods.*—At times cultures are of great assistance in making a diagnosis because precysts, cysts, and atypical trophozoites become typical trophozoites showing the characteristic morphology and motility. However, the cultures must be made properly and carefully, using proper media, aseptic methods, and examining at the proper time. Cultures should not be relied upon entirely because our experience during the Chicago epidemic has taught us that only about 5 to 8% of the small variety *E. histolytica* grow in the culture medium used for the large variety. The presence of arsenic and other amebicides prevent *E. histolytica* from growing. Routine cultures are unnecessary in making a survey.

MEDIA

Cleveland and Collier (Liver infusion agar)

This medium is one of the best for practical diagnostic purposes. The medium consists of slants of liver infusion agar.

30 gm. liver infusion agar (Digestive Ferments Co., Detroit, Mich.)

3 gm. dehydrated sodium phosphate.

1,000 c.c. distilled water.

Dissolve, tube about 5 c.c. per tube, sterilize 15 lb. for 30 minutes, slant and keep in the ice box until shortly before using.

Before making inoculation these slants are overlaid with sterile serum saline 1-6. (Wassermann negative human inactivated serum, horse or rabbit serum, etc., may be used by taking 1 part of serum to 6 parts of NaCl, filtering through a sterile Berkefeld filter, incubating 24-48 hours to test sterility. If sterile, place in the ice box until shortly before using.)

The slants and serum saline should be placed in the incubator for a couple of hours before using in order to bring the temperature up to body temperature. Sterile precautions should always be used in making the cultures. Before making inoculations the slants are overlaid (sterilly) with sterile serum NaCl, 1-6. A little sterile rice starch or rice flour may be added, but is not necessary. If the stool is soft, watery, or bloody mucus, a little is inoculated, using a sterile pipette or needle. If the stool is solid, a loopful is inoculated, macerating well by rubbing with the needle against the sides of the tube. Incubate at 37.5° C., and examine after 24 and 48 hours. Cultures should not be examined prematurely because occasionally *E. coli* grows in this medium, and in young cultures when rapid division takes place the nuclear structure may not be typical, the motility rapid; so that one may have difficulty in differentiating *E. histolytica* from *E. coli*. Occasionally subcultures are necessary in order to decide as to whether an organism is *E. histolytica* or *E. coli*. In 24-48 hour cultures, even when *E. coli* is present, it shows its typical characteristics—thick wall, sluggish motility, the entire organism seems to roll about in its wall. *E. histolytica*, on the other hand, has a thin wall and moves rapidly by means of a pseudopodium in an elongating, slug-like manner.

"Mature living *E. histolytica* cysts do not all hatch simultaneously nor at the same rate; some hatch quickly, others slowly. They usually begin to hatch after 2¼ hours' incubation. Cysts which do not hatch after 12 hours' incubation usually perish. Occasionally some hatch after 20 hours' incubation. Cysts begin to hatch when the chromatoid bodies and glycogen disap-

pear." C. Dobell, *Parasit.* 20, 4:383, 1928.

All other intestinal amebae do not grow as readily in this culture medium and cannot be maintained in culture as long as *E. histolytica*. When the other intestinal amebae grow in this culture medium they show their typical characteristics and should not be confused with *E. histolytica*.

In order to keep strains of *E. histolytica* going, make sub-cultures every 48 hours (using sterile precautions). A little sterile rice flour or rice starch is added to the liver infusion agar slants overlaid with serum saline before making the inoculations. To make the sub-cultures, use a sterile pipette with a good sized bore and transfer a little of the sediment, taking as little of the supernatant fluid as possible. Some strains of *E. histolytica* grow readily, while others grow with great difficulty.

Locke Serum Medium of Craig

This medium consists of a mixture of a modified Locke solution and inactivated human, horse or rabbit serum. The serum used should not be over 48 hours old.

Locke solution:

Sodium chloride	9.0 gm.
Calcium chloride	0.024 gm.
Potassium chloride	0.42 gm.
Sodium bicarbonate	0.20 gm.
Distilled water	1,000 c.c.

Filter and autoclave 15 lb. 15 minutes.

Medium:

1 part inactivated (56° C. ½ hr.) serum to 7 parts Locke solution.

Filter through a Berkefeld filter.

Tube 10 c.c. per sterile tube.

Incubate 24-36 hours to test sterility.

Keep in incubator until used.

A slight amount of sterile rice starch or rice flour increases the efficiency of this medium.

(g) *Complement-fixation in the diagnosis of amebiasis and amebic dysentery.*—The technic is practically the same as that used in the standard method for the complement-fixation of syphilis in the United States Army laboratory fully described in Craig's "The Wassermann Test" (1920), except that the specific amebic antigen is used. The anti-human as well as the anti-sheep system may be used.

Any reaction below 3+ should not be considered diagnostic unless the patient has been treated. Upon treatment the complement-fixation becomes negative.

THE MEDICAL MANAGEMENT OF AMEBIASIS

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The literature on amebiasis has been markedly increased in the last three years. Recent events, no doubt, have stimulated the interest in amebiasis and have done a great deal to augment our knowledge and to standardize the diagnosis of this disease. Our clinical laboratories have become more adept in stool analysis, and have developed more competent protozoölogists who are able to recognize and differentiate parasitic amebae in the stools of man. However, there is still much to be desired, from the clinicians' standpoint, as regards the management of amebiasis. In the treatment of syphilis, the Wassermann is an aid, not alone in diagnosis, but also in determining whether the patient has had adequate treatment. In malaria, the clinical picture, the cessation of the periodic attacks of chills and fever, and the disappearance of plasmodia from the blood stream are usually sufficient evidence that the disease has been eradicated. In amebiasis it is often difficult to be certain of the efficacy of treatment. The symptomatology is often indefinite and one cannot place entire reliance on negative stool examinations. The complement fixation test should be of great assistance but it has not been used extensively. Craig[1] has shown that this test is reliable, not alone for the diagnosis of the presence of Entameba histolytica in the stools, but also because the reaction disappears after eradication of the amebic infection. In 86% of the patients he examined, the reaction became negative within fourteen days after cessation of treatment. The remaining cases became negative 28 days after treatment. Unfortunately, the procedure is still too difficult to advocate its use routinely, though, according to Brown and Magath,[2] if improvements and simplifications are made, it promises to be an extremely useful test.

Despite these clinical handicaps, the medical management of the patient with amebiasis should have, as its ultimate goal, a "cure." One might

Read before Joint Session of Sections on Medicine, Surgery, Public Health and Hygiene, 86th Annual Meeting, Illinois State Medical Society, Springfield, May 20, 1936.

ask what constitutes a "cure." As Mackie[8] has said, "A discussion of treatment must distinguish between a clinical cure or relief of symptoms, and a protozoölogical cure or complete eradication of parasites." The latter, of course, assures the former, though the converse is not necessarily true. As Mackie further states, "Any therapeutic cure must have the achievement of both goals as its objective."

In the carrier group of patients, clinical cure is difficult to evaluate as many of these individuals have indefinite symptoms. Some patients have normal evacuation, while others have only an occasional loose watery stool; some

Resume of Drugs Used in Amebiasis

		Dose	Method of Administration	Total Daily Dosage	Total Dosage	Length and No. of Courses	Toxic Manifestation	Objections to Drug	Advantages, Results Obtained, Present status of drug
Ipecac Emetine Group I	Ipecac	.325gm (5grains)	Orally sugar coated tablets	10-15 tablets Nightly	180 tablets (60gm)	10 days Usually one Course.	Nausea - Vomiting Weakness. -	Diet Restrictions Bed rest required.	Displaced by Emetine & other modern drugs.
	Emetine Hydrochloride	.035-.065gm (.5 - 1 grain)	Hypodermically (Subcutaneously)	.035-.065gm. (.5 -1 grain)	.78gm. (12gr)	1 gr daily for 12 days or 1gr. bid 2 days with 1 day rest between 3 to 5 days.	Myocardial degen. Tachycardia early sign Muscular weakness Fatal cases reported Toxic dose .2gr.	Toxic reaction. Cumulative action	Specific action in acute amebiasis-dysentery group - amebic hepatic abscess - pleuro-pulmonary complications
	Emetine bismuth Iodide	.2gm (3gr)	Orally - Gelatine capsules	2gm (3gr)	2.4gm. .36gr.	12 daily or 1 Weekly one. May repeat after a week if necessary.	As for emetine, More nausea and Vomiting.	Set toxic reaction for emetine	No advantages over emetine.
Arsenic Group II.	Stovarsol (Acetarsone)	.25gm. (4gr.)	Orally - Tablet.	½ to one tablet t.i.d. .35gm. (6gr) .75gm (12gr)	2.5gm. (42gr) 5.1 gm. (84gr)	2 courses - 1 week each, one week apart.	Arsenic poisoning Gastro. intestinal symp. Erythema. Neuritic Visual and Acoustic Symph.	Idiosyncrasy. More Toxic than other arsenicals. Not advisable in acute hepatitis.	Displaced by safer Arsenicals.
	Treparsol.	.25gm (4gr)	Orally tablet.	.25gm. t.i.d. or .75gm daily (12gr)	3gm. (48gr) to 5.2 gm (84gr)	4 - 7 days. 2 courses at 7-10 day intervals.	Arsenic reaction Less than Acetarsone. Occas. erythema	Possible arsenic reaction Not advisable in hepatitis.	Eliminated regularly & slowly. Starting immediately and eliminated by third day after cessation of treatment. Safe good amebacide
	Carbarsone	.25gm (4gr)	Orally - (Capsules) .25 gm bid. .5 gm. (8gr) Rectally - 200 c.c. .2% solution with ingCarbarsone.	.25 gm bid. .5 gm. (8gr)	5 gm (80 gr) 5 retention enema) alternating nights.	10 days & repeat in 10 days.	None reported by Reed - Anderson. Lake & David.	Possible arsenic poisoning. Not advisable in hepatitis.	Highly recommended. Especially used with emetine and vioform
	Arsphenamine	.3 - .4 gm	Intravenously.	——	——	At weekly intervals for 4 - 8 weeks	——	Expensive & difficulty of administration.	Not used extensively. (Occas. in resistant cases.)
Oxyquinoline Group III	Yatren (Chiniofon)	.25gm. (4gr)	Orally	.25 gm t.i.d or .75 gm.	7.5 gm. (120gr)	10 days Usually two or more At ten day intervals	Diarrhea	Displaced by Vioform	Reported satisfactory.
	Vioform	2.5 gm. (40 gr)	Orally - tablets Enteric coated suggested.	.75 gm (12gr) t.i.d.	do	10 days Usually two or more, at ten day intervals	Less than yatren.	Rare gastro-intest. Symph.	Good results reported. Used with arsenicals & emetine.
Misc. Group IV	Bismuth Subnitrate.	Heaping teaspoon	By mouth in Soda water.	9 - 3 hrs	for 20 days. then t.i.d. indefinitely. -		Nitrite reaction	Carbonate of bismuth as effective.	Not widely used except in Panama - by Docks. Used as adjuvant
	Bismuth Subcarbonate	As above	By mouth	May be given as above.			None noted	Not strong amebacide	As above.
	Di-hydranol.	.3gm (4.5gr)	Capsule by mouth Drug in olive oil	B.i.d or t.i.d	4 to 10 gm. (60 gr to 150 gr)	7 days Usually one	Sl diarrhea	Not strong amebacide	Not extensively used.
	Chaparo Amargosa	No limit	Infusion entire plant	Used orally & rectally.			None	" "	" "
	Auremetine	.065gm. (1gr)	Orally	4 daily (.25gm or 1gr) or Alternate days.	Other 1st week, one daily, ½ total dosage.	For total dosage of 2.5 to 3.5 gm. (40 to 60 gr)	Contains emetine None recorded	Not recognised as strong amebacide	

Figure 1.

have periods of mild diarrhea, alternating with constipation. Other patients have increased flatulence, vague abdominal pain, occasionally simulating peptic ulcer or even mild cholecystitis. It is uncommon in this group to find ulceration in the lower rectum or recto-sigmoid. There is, however, sufficient evidence in the literature that even in this group definite ulceration exists in the colon or lower ileum. It would seem then that greater attention should be directed towards the eradication of amebae from the patients in the asymptomatic group. The acutely ill patient will usually have sufficient treatment and will be followed to a "cure," for both the physician and patient are fully aware of the seriousness of the illness; but the carrier is more likely to be treated haphazardly and to disregard adequate treatment and satisfactory follow up. He, therefore, becomes a greater hazard to society and continues to spread infection to others. He is also in potential danger himself as regards an acute dysentery, hepatic involvement, or other manifestation of acute amebiasis.

It is with these thoughts that one approaches the medical management of amebiasis, realizing that, even with all the drugs at our command, certainty of the eradication of amebae from the stools cannot always be assured. The treatment is not a specific one, and the clinician must vary the drugs to secure a high percentage of therapeutic cures.

Despite the clinical handicaps, the results of treatment of amebiasis as reported in the literature are quite satisfactory. In a series of 500 cases seen in the last fifteen years, Brown[4] reports apparent final cure in 91.1%. The treatment (in this series of patients) consisted largely of emetine and treparsol, though drugs of the oxyquinoline group and carbarsone were used in a large number of patients.

Reed and Johnstone[5] report a series of 63 cases in whom very satisfactory results were obtained with carbarsone and vioform. Thirty-one were treated with vioform and three (9.6%) remained positive after eight, ten, and sixteen months respectively. Thirty-two cases were treated with carbarsone and all remained negative.

Thonnard-Neumann,[6] using di-hydranal in 28 carriers, reports good results in all but seven.

P. Mühlens,[7] over a period of eight years, used yatren by mouth and reports cures in from 70% to 100% of all patients treated.

There has been a great deal written as to the action of the various drugs, the question being whether the drug acts upon the parasite within the tissue of the host, or as it lies free in the fecal current. Deutsch[8] believes that emetine acts through the blood stream and is excreted by the kidneys, and is, therefore, more effective on amebae in the blood stream and in vascular organs such as the liver. It is not as effective on cysts, because of its low concentration; just as anthrax spores are more resistant to antiseptics than B anthrax itself. The universal approval and use of emetine in amebic hepatitis and hepatic abscess would appear to warrant such a conclusion.

Other authors believe that certain drugs act more specifically on the amebae in the bowel and advise the use of drugs placed directly in the colon either by enema or by insufflation. Anderson and Reed[9] recommend administration of some of the arsenicals by rectal injection, particularly carbarsone. Soper[10] believes that frequently carriers develop secondary ulcers just

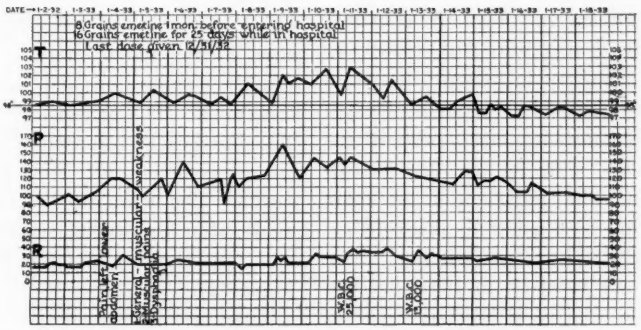

Figure 2. Chart showing toxic reaction of emetine.

above the anal sphincter, and that a connective tissue barrier forms preventing emetine from reaching the amebae. Therefore, in addition to using emetine intravenously, he gives vigorous proctoscopic treatment by insufflation of a powder of calomel and bismuth subcarbonate.

However, we do not have accurate knowledge of the specific action of the various amebacides. Toxic reactions have been reported after the use of emetine, stovarsol, treparsol, carbarsone, and others, so that no doubt all are poisonous to protoplasm of both the host and the parasite. A knowledge of the toxic reactions of the drug used is necessary to the proper and cautious

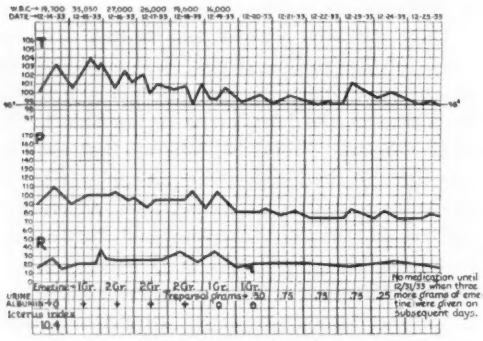
T
P
R
Emetine-1Gr. 2Gr. 2Gr. 2Gr. 1Gr. 1Gr.
Treparsol grams-.50 .75 .75 .75 .25
No medication until 12/31/33 when three more grams of emetine were given on subsequent days.

Figure 3. Chart showing response to emetine therapy in patient with hepatic involvement complicating amebiasis.

management of amebiasis. It would appear then that a drug should not be discarded if occasionally, even on proper dosage, toxic symptoms occur.

The drugs most frequently used in the management of amebiasis can be classified in the following groups.

1. THE IPECAC GROUP. (See Figure 1).

Ipecac, used for dysenteries by the natives of Brazil, was first advocated for use in amebiasis by Simon[11] and Dock[12] in 1909. Salol-coated pills, containing five grains, were administered at night in doses of from ten to fifteen pills, for a total dosage of one hundred. Ipecac is of value in the treatment of amebiasis but because of the difficulties associated with its use, the nausea and vomiting, and the introduction of more modern drugs, it has been generally discarded.

Emetine, the alkaloid of ipecacuanha, introduced by Rogers and Vedder[13] in 1912, has had perhaps the widest and most universal use of all amebacides. It is generally accepted that of the alkaloids of ipecac, emetine is superior to the other amebacidal alkaloids, cephaeline and psychotrin. Its action on the acute manifestations, particularly on amebic hepatic abscess, is rather spectacular. In fact, since its introduction, death from amebiasis has become rare. However, of late, emetine appears to be a much criticized drug, both because of its toxicity and because of the fact that such men as Craig[1] and Willner[14] state that even with increasing doses, the percentage of permanent cures is exceedingly low.

The toxic dose of emetine is given by various authors as over .06 gram (1 grain) daily for twenty-one days, or 1.37 grams (21 grains). Most clinicians give from ½ to 1 grain daily, though some give 1 grain twice daily for periods of four days. Brown[4] uses, as a rule, for an average dose .78 gram (12 grains) subcutaneously over a period of four weeks. This is given in two courses of 8 grains and 4 grains, about ten days apart. Emetine injected subcutaneously is much less painful than when injected intramuscularly and appears to be just as effective.

One employing emetine must be fully aware of its toxic symptoms and able to detect these promptly, as it has a cumulative action. Its toxic effect appears to exert itself upon the heart muscle producing a myocardial degeneration which manifests itself clinically by an increase of the pulse rate. In one case which came under observation, after 24 grains of emetine had been administered over a period of approximately sixty days, the heart rate rose as high as 160. The pulse became weak and the electrocardiogram showed inversion of the T wave in all leads. The patient developed marked muscular weakness, confined particularly to the legs. Difficulty in swallowing was also noted and rather suddenly there developed a large painful mass in the rectus muscle. This mass subsequently disappeared and was thought to be a hematoma. The patient also ran a slight fever. The diarrhea, so often noted in emetine toxemia, did not come on until some days after the tachycardia. The heart rate remained rapid for some weeks after the initial reaction and the patient did not regain strength for months. (See Figure 2).

Emetine-bismuth-iodide, a combination of 29% emetine, 12% bismuth, and 58% iodine

was introduced about 1915, particularly for treating carriers and resistant cases of amebiasis. As it contains emetine, it has the same toxic reaction as emetine when given in too large doses. In addition, it frequently causes nausea and vomiting that become so severe that further administration of the drug has to be stopped. It is administered by mouth in gelatine capsules of 0.2 gram (3 grains) per dose each night after the meal for twelve consecutive days. After an interval of a week or two, the course may be repeated if necessary.

2. THE ARSENICALS. (See Figure 1).

The second group of drugs used in the treatment of amebiasis is the arsenicals: acetarsone, treparsol, arsphenamine, and carbarsone.

Acetarsone (acetyl-amino-hydroxy-phenyl-arsonic acid), introduced originally for the treatment of syphilis, has been used quite extensively in amebiasis. It is also known as stovarsol. It contains about 27.2% arsenic.

Treparsol (amino-oxy-phenyl-arsenic acid) was introduced about the same time as acetarsone. It contains slightly more arsenic (28.75%) than acetarsone. While acetarsone and treparsol are mentioned interchangeably in the literature, it has been shown that acetarsone is eliminated more irregularly than treparsol. Therefore, the percentage of toxic reactions is greater with acetarsone than with treparsol. Willmore and Martindale[15] believe that an idiosyncrasy to acetarsone exists in certain individuals, especially after repeated courses. As treparsol is eliminated more slowly and regularly it possesses advantages over acetarsone. Elimination of treparsol begins one day after its administration and is completed by the third day after cessation of treatment. In addition, treparsol is decomposed in the bowel and forms soluble salts which act directly on the parasites in the intestines. The dose of these drugs is .25 gram (4 grains) usually given two to three times a day for periods of four days to a week, and repeated after a week's interval. The toxic reactions reported following the use of acetarsone are: toxic erythema, peripheral neuritis, vomiting, diarrhea, visual and acoustic disturbances. However, with treparsol one sees only an occasional case of toxic erythema, though Brown[4] reports one patient with nausea and vomiting after taking four doses. I have, in my experience, noted some tendency to diarrhea and one case of erythema which lasted but a few days.

Flandin,[16] who combines treparsol with emetine, gives a course of emetine for the first week and then, for one to two months, gives a course of treparsol .25 gram by mouth four times daily on the first four days of each week. He reports 80% improvement in his cases.

Carbarsone (4-carbamino-phenylarsonic acid) which was introduced by Reed, Anderson, David and Leake[17] in 1932, contains 28.85% arsenic. These authors contend it is less toxic than acetarsone or treparsol and a better amebacide. In their hands, they have seen only one incidence of toxic reaction, in a patient with an acute hepatitis. Carbarsone is usually given by mouth in gelatine capsules of .25 gram (4 grains) twice daily for ten days, and in resistant cases Anderson and Reed[9] suggest the use of carbarsone rectally. They propose first cleansing the bowel by irrigation, then following with the instillation of 200 cc. of 2% sodium bicarbonate solution containing 1% carbarsone. The retention enema is retained overnight. Treatment is repeated until at least five enemata are given on alternate nights.

Arsphenamine has been used by some clinicians in resistant cases with quite satisfactory results. This is used in the form of neoarsphenamine, four to eight injections of .3 gram being given at weekly intervals. The chief objections to it are: expense, difficulty of administration, and toxicity.

3. THE OXYQUINOLINE GROUP. (See Figure 1.)

The third group of drugs is the oxyquinoline group.

In 1921 Mühlens and Menk[18] introduced yatren as an amebacide. Yatren chemically is sodium hydroxyquinoline sulphonate containing 26% to 28% iodine. The drug is sold in this country as chiniofon. It is also called anayodin. The latter has received much favorable comment as an amebacide from O'Conner and Hulse.[19] They report 51 cases, 49 of whom, examined two to six years after treatment, showed negative stools. Yatren is used by some authors both orally and rectally. The dose is .25 gram tablets by mouth and a rather large number are required. The dose frequently causes some diarrhea after the second and third day of treatment. The action of the drug is a direct one and depends upon the iodine content. Because

of this, Craig,[1] and O'Conner and Hulse[19] are of the opinion that it is not effective in liver abscess. Anayodin (a proprietary name for chiniofon) was not accepted by the Council of Pharmacy and Chemistry of the American Medical Association.

Vioform (iodochlorhydroxyquinoline) has been available since 1933, and it would appear that there are fewer reactions and less diarrhea than with yatren (chiniofon). David, Johnstone, Reed, and Leake[20] investigated some eleven halogenated hydroxyquinoline compounds and concluded that vioform is the most promising of the group, with the exception of di-iodohydroxyquinoline which is still under investigation. The dosage for vioform as used by these investigators is .25 gram three times daily or .75 gram per day for a 75 Kg. person for ten days. A second course is given after a rest period of a week or ten days. The above authors found no signs of toxicity nor any unpleasant symptoms in any patient. Forty-seven cases were treated and actual cure was obtained in 38, as determined by repeated stool examinations.

Anderson and Reed,[21] treating 60 individuals with vioform, noted in three instances some type of gastric upset, such as: colic, diarrhea, nausea, vomiting, and headache. These authors are using enteric-coated pills instead of capsules in an effort to avoid further reactions. As in chiniofon (yatren), the action on the ameba is a direct one. The soluble hydrochloride of vioform is irritating to the mucous membrane in dilutions 1:500 and therefore, rectal use is not advisable. Because of a high iodine content vioform should be a valuable amebacide. However, too short a time has elapsed since its introduction, to form definite conclusions.

4. MISCELLANEOUS GROUP. (See Figure 1.)

In the fourth, or miscellaneous, group of drugs are included: astringents and antiseptics, the bismuth compounds, heptylresorcinols, chaparro amargoso, kurchi bark, kurchi-bismuthus-iodide, and auremetine.

The bismuth compounds include the subcarbonate and subnitrate. Of the bismuth compounds the subcarbonate appears as effective as the subnitrate and is devoid of nitrite reaction. These drugs are frequently used as adjuncts, particularly with emetine and kurchi bark and kurchi bark alkaloids. Craig[1], in discussing the subnitrate of bismuth, says that so far as permanent cure is concerned, the results are uncertain.

Heptylresorcinol or di-hydranol, suggested by Faust[22] in 1930, has been used as an amebacide, as have others of the alkylresorcinols. This author reported satisfactory results in a small group of carriers. However, Mackie[23] in 1931, found the drug to have little effect on the Entameba histolytica. Leake[24] is of the opinion, "That further laboratory investigation of these drugs (the alkylresorcinols) is desirable." He says that in view of the fact that hexylresorcinol is less toxic and a better antiseptic than heptylresorcinol, it would seem that heptylresorcinol must be shown to be a better amebacide or else dropped from further consideration. This group of drugs has not been extensively used and one's judgment as to their value must be reserved for the present.

Chaparro amargosa is a plant whose habitat is Texas. The infusion of the entire plant is used both orally and by enema. This drug is only occasionally mentioned in the literature and apparently has not had wide usage.

Kurchi bark and its alkaloids have been used in the treatment of amebiasis for many years. Results have not been favorable and, in addition, a depressing effect has been noted upon the heart. Kurchi-bismuthus-iodide has largely replaced both the kurchi bark and its alkaloids. The dose of kurchi-bismuthus-iodide is .065 gram (1 grain) three times a day for periods of as long as four to six weeks. (Craig[1]).

In 1926, Willmore and Martindale[15] took an aniline dye, (the hydrochloride of tetramethyl-diamion-diphenyl-ketonimine) called "auramine" and combined it with emetine and gave it the name of auremetine. This drug contains 28% emetine, 16% auramine, and 56% iodine. These authors obtained very gratifying results in forty cases, though in their acute cases they used, in addition, stovarsol and Panama bismuth. In the carrier cases they used Panama bismuth with the auremetine.

Numerous drugs have been mentioned from time to time, including quinine, mercury, silver salts, etc. Various other types of treatment have been suggested and tried, such as the de Rivas method of irrigating the colon with water at temperatures between 50-55 degrees centigrade, using various solutions—yatren, copper sulphate, etc. Brown[4] mentions using kerosene by

enema in many of his patients during the month of emetine treatment. Craig,[1] however, feels that, with the exception of chiniofon, colonic irrigations are of little value in the treatment of amebiasis.

Diet. The importance of restriction diet in the treatment of amebiasis depends somewhat upon the type of infection. The earlier clinicians, using ipecac and other drugs, advised liquid and low residue bland diets. It is now rather universally accepted that in treatment of the carrier or mildly symptomatic group little attention need be paid to diet. In the acutely ill patient the diet is restricted and determined largely by the severity of the diarrhea.

There has appeared in the literature some evidence that diet is a factor in the severity of the infection and the ease of the eradication of the parasites. This is especially so in the tropics where it has been noted that those individuals who have been on a restricted and particularly high carbohydrate diet have a more virulent infection than those on a full diet or on one low in carbohydrates.[25]

In experimental animals Faust and Kagy[26] studied the effect of feeding ventriculin, liver extract and raw liver to dogs infected with Entameba histolytica. These authors found that liver extract and, especially, raw liver by mouth were beneficial to the host and appreciably arrested the amebic process. Raw liver, in certain cases, produced complete eradication of the organism. Ventriculin, however, was found to be consistently harmful to the host in that it not only failed to check the invasion of the amebae, but actually reduced resistance of the tissues of the bowel wall to secondary invasion of bacteria. These authors explain in part the beneficial effects of liver extract and raw liver as due to: first, a dehydration of the stool, with resulting encystment of the amebae; second, prevention of the invasion of bacteria and secondary infection; and third, neutralization of toxins produced by protein degeneration in the large bowel.

Treatment of the Carrier. In view of the relatively large percentage of our population harboring the Entameba histolytica, this group of individuals should receive adequate attention as to treatment and careful follow-up. It is only by attempting to fully eradicate the amebae from this group that the incidence of amebiasis will be lowered. It is generally agreed and quite definitely shown that Entameba histolytica can be eradicated from the stools of these individuals by the administration of drugs from the arsenical and oxyquinoline groups without the use of emetine. Using drugs from both of these groups seems to give better results therapeutically. They must be given in adequate dosage, with repeated stool examinations for at least six months following treatment.

The Treatment of the Dysentery Group. In acute amebic dysentery emetine is the drug of choice and quickly controls the diarrhea. It can be given hypodermically in ½ to 1 grain daily until 12 grains are given, or its dosage may be divided into two courses of first eight and then four grains given a week later. The patient is also given treparsol .25 gram (4 grains) tablets three times daily for four days. This is repeated after a ten-day rest; but it would be best to modify the treatment with a course of vioform, .25 gram (4 grains) given three times daily for a week. Usually this will be adequate, but further treatment will depend upon the stool examinations. Carbarsone may be substituted for treparsol giving .25 gram or 4 grain doses twice daily for ten days, and repeating after ten days. Stools must be examined repeatedly for at least a period of six months.

The Treatment of Amebiasis with Hepatic Abscess and with Pleuro-Pulmonary Complications. Emetine in the treatment of hepatic abscess and in those cases with pleuro-pulmonary complications gives such spectacular results that it can be used almost as a therapeutic test for this condition. The same dosage can be followed as that used in the dysentery group of patients.

The most outstanding example of the value of emetine in this group is that of Ochsner and De Bakey[27] who analyzed 153 cases of whom 63, or 41.1%, died. Summarizing the type of treatment used, 56 patients were treated by open drainage and 27, or 48.2%, died. Twelve patients were treated by emetine and open operation and of these two died, or 16.6%. Thirty-seven were treated by emetine alone and of this group two died or 5.4%. Of the entire group of 153 cases, 49 patients received emetine with only four deaths or 8.1%. These authors are of the opinion that emetine is the specific drug in pleuro-pulmonary amebiasis and hepatic abscess.

Holmes[28] regards the treatment of acute hepa-

titis and hepatic abscess complicating amebiasis as a purely medical problem; and maintains that open operation is performed with an extremely high mortality. Aspiration, while less likely to result in secondary bacterial invasion, is almost counterbalanced by its own peculiar shortcoming, lack of adequate drainage. Holmes cites two cases with hepatic involvement that were successfully treated with the use of emetine.

One such case which came under my observation demonstrates the value of emetine. Four years previously, this patient, a male, thirty-six years of age, had complained of abdominal pain, fever, and constipation. X-rays of the colon showed a persistent defect in the cecum which was thought to be inflammatory. A leukocytosis of 19,000 was found. At operation a large edematous appendix was removed and the same edematous thickening was noted involving the ascending colon and cecum. Four years later he developed an acute pain over the right upper abdomen and a referred pain over the acromial process of the right shoulder. He subsequently developed fever and a rigid abdominal wall. Stool examination showed only one ameba that was not definitely identified. X-rays showed an enlarged liver with a raised right diaphragm. Sections of the appendix, removed four years previously, were obtained and amebae identified in a mass of mucus lying in the lumen. Ulceration of the mucous membrane was seen and amebae identified infiltrating into the wall of the appendix. Fever rapidly subsided on emetine therapy and the patient made an uneventful recovery. (See Figure 3.)

Royster, Haywood, and Stanfield[29] advise repeated aspirations of an amebic hepatic abscess and the injection of emetine, both intramuscularly and locally into the amebic abscess. They report one case and, in conclusion, quote from Carson's *Operative Surgery* (1924) a paragraph written by G. Grey Turner which states that while some abscesses can spontaneously recover, the one essential is to saturate the circulating lymph with emetine.

According to Craig,[1] aspiration gives good results when combined with emetine therapy, but open operation for these complications of amebiasis is hardly justified except in those cases where secondary infection is present, and then only after adequate emetine therapy.

It is the general opinion that amebacides, such as one of the arsenical or oxyquinoline group, should not be used in amebic infections of the liver, at least in the acute state. However, after treatment with emetine, when the hepatic and pulmonary complications have subsided, the amebae present in the intestines should be cautiously treated by a drug of either the arsenical or oxyquinoline group.

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Figure 1. Resumé of drugs used in amebiasis.

Figure 2. Temperature chart of patient with emetine intoxication.

Figure 3. Temperature chart of patient with hepatic abscess showing action of emetine.

SURGERY IN AMEBIASIS

GATEWOOD, M. D., F. A. C. S.

CHICAGO

"Every chirurgion ought to be learned and that he knows his principles, not only in chirurgie but also in phisicke that he may better defend his chirurgie."—Thomas Vicary (1577).

This statement of old Sir Thomas might just as well have been written in 1936, after a study of some of the errors of commission as well as those of omission in the surgery of amebiasis.

Counselman and Lafleur,[1] in 1891, first described the pathologic lesions of amebiasis and differentiated them from those of bacillary dysentery. The action of Entameba histolytica is fundamentally the same in all the tissues that it invades. This action is dependent upon mechanical invasion by means of pseudopods and a toxin acting directly on the host. Having penetrated the epithelium of the intestine, the amebae advance along the basement membrane or penetrate it near the surface of the mucosa to enter the stroma beneath the glands. Eventually they multiply and break through the muscularis, spreading through the mucosa in all directions. The mucosa then becomes greatly thickened and edematous. Temporarily, the muscular coats offer a barrier, but when invaded, the subserous tissues become water-logged and the serosa is covered with fibrin. This may lead to adhesion formation with subsequent obstruction, or to perforation with local or general peritonitis.

Grossly, three types of lesions are observed: 1. shallow ulcerations surrounded by a narrow ring of hypermia, 2. a diffuse granular appearance of the mucosa with visible ulceration, and 3. sharply circumscribed nodular projections of the mucosa, between which are seen small depressed yellow openings surrounded by hyperemic rings. These openings lead into cavities containing a gelatinous material. The more extensive lesions usually produce permanent thickening, rigidity, and often stenosis. Localized lesions are found most frequently in the large bowel where stasis normally occurs, i.e., the cecum, ascending colon, rectum, and sigmoid, the transverse colon being the least commonly involved. Amebic involvement of the appendix alone is occasionally seen, but usually is only a part of cecal involvement. Where the appendix is the site of the chief lesion, it is tumified and contains characteristic small ulcers. Clark[2] states that the symptoms are those of acute or chronic appendicitis of bacterial origin except that the leucocytosis is slight unless perforation has occurred.

Miss B. J. (Case No. 285295), a professional danseuse, entered the Presbyterian Hospital July 11, 1933. She gave a history of diarrhea beginning a week previously, with three to seven stools daily. The diarrhea ceased in three or four days on the usual medical management but cramps continued and her temperature varied from normal to 102° F. Two stool examinations, made before admission, were negative for amebae. On examination the patient was a somewhat slight young woman with no noteworthy findings excepting marked tenderness in the right lower quadrant, some muscular resistance, but no definite mass. Leucocyte count was 30,000, having been 20,000 the day before admission. Stools contained some chemical blood, but no amebae were found. Bimanual examination under gas anesthesia was somewhat unsatisfactory but one could fairly well exclude a pelvic infection, and there seemed to be a mass in the cecal fossa. Operation was advised with the diagnosis of appendicitis with spreading peritonitis. On opening the abdomen, the peritoneum was found to be injected, edematous and there was turbid fluid between the loops of the intestine. The cecum was distended and dark red. The wall was thick and almost leatherlike. The appendix, which was retrocecally placed, was removed with some difficulty owing to the edema of the

Read before the Illinois Medical Society, Joint Session of Section on Medicine, Surgery and Public Health and Hygiene, Springfield, Illinois, May 20, 1936.

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large bowel. The distal ileum was also somewhat edematous. The condition was recognized as amebiasis and emetine therapy was begun at once. In spite of the treatment, immediately following the operation the patient's temperature went to 105° F. and remained from 103° to 104° F. for four days, or until her death. She became profoundly toxic and died with the picture of general peritonitis. (Amebae were recovered from the stools post-operatively.)

This story has been repeated many times during the past five years. At operation, the bowel

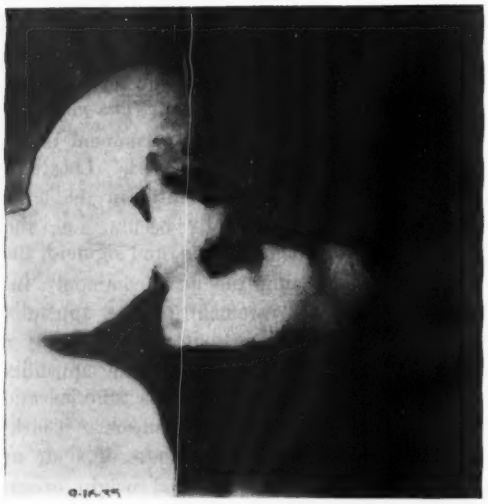

Fig. 1. Showing multiple obstruction and distended loops of small bowel. Mr. J. N., 9-16-35.

is edematous, thickened and so friable that any operative procedure is followed by rupture of the bowel and general peritonitis. It is almost impossible to suture ameba-infested bowel and invagination of an appendix stump subsequently breaks open with extensive leakage. Spontaneous rupture with general peritonitis occurs but rarely, and conservatism with medical management has saved many lives. As an example:

Miss E. W. (Case No. 313863), a social worker, aged 25 years, entered the Presbyterian Hospital February 15, 1936, complaining of severe pain through the whole abdomen which began three weeks previously and lasted for two and a half days. There had been pain in the right lower quadrant from the onset, some nausea and vomiting, and a slight tendency to diarrhea. Her local physician made the diagnosis of acute appendicitis, but as the condition seemed to be subsiding, he advised further waiting before removal of her appendix. As the pain had continued, the patient came into the hospital for appendectomy. On admission there was little to add to her history except that her bowels were always regular prior to the onset of her present complaint and that the slight diarrhea persisted for only two days. On examination, there was a very localized area of tenderness in the right lower quadrant with slight muscle spasticity and no palpable mass. Her temperature was normal. The leucocyte count was 16,450, of which 66% were polymorphonuclear leucocytes. Seven stools were all soft formed, and negative for blood. No amebae, cysts or pus were found in direct smears, but cultures were positive for E. histolytica. On emetine and carbarsone therapy the patient recovered very promptly.

There are a number of other intestinal complications which tax the diagnostic acumen and technical ability of the surgeon. One of these is the development of obstructive symptoms either with or without a mass.

Mr. J. N. (Case No. 309395), a 52-year-old white male, entered the hospital September 15, 1935. He stated that two years previously he had been ill with amebic dysentery and had improved rapidly under treatment. About a month before admission, he noticed a recurrence of alternating constipation and diarrhea. Ten days previously, he began to have epigastric cramp-like pains which seemed to travel across the abdomen and which were relieved if flatus could be expelled. He had been checked up in New York two weeks before admission and no amebae were found although he had been given vioform capsules (iodo-chlor-oxy-quinoline) of which he had taken twenty just prior to admission. On September 14, the patient became distended and

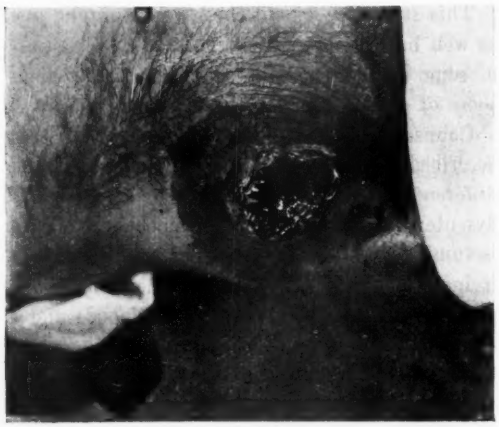

Fig. 2. Amebic infection of abdominal wall secondary to cecostomy. Mr. J. N., 11-26-35.

vomited. Abdominal cramps increased in severity, coming every few minutes and lasting a minute or two. The patient had lost ten pounds in the preceding month.

On examination, he was somewhat undernourished. The abdomen was uniformly distended and the abdominal wall was tense. There was a great deal of gurgling in the upper abdomen. Although the abdomen took on changes of form, no definite peristaltic waves were seen. His temperature was 99.2° F. and the leucocyte

count was 13,600. X-ray on admission showed greatly distended loops of small bowel such as one finds in acute intestinal obstruction. (Fig. 1) Fluoroscopic examination revealed a napkin-ring type of deformity at the junction of the sigmoid and rectosigmoid, suggesting malignancy. However, there was also a filling defect in the sigmoid (A) and the roentgenologist noted that the appearance of two defects would lead one to suspect an inflammatory or scar tissue obstruction rather than malignancy. No amebae were found on smear or culture at this time. Owing to the high grade intestinal obstruction, an exploratory laparotomy with probable colostomy was decided upon.

At operation, September 16, 1935, the loops of the small bowel and the colon were greatly distended. There was considerable slightly turbid free fluid, and in the region of the sigmoid there was a small annular constriction about 2.5 cms. long. The colon was thick-walled and injected. A cecostomy was done with some difficulty owing to the friability of the intestine. The appendix was as large as one's index finger. The patient had a rather stormy convalescence but gradually gained strength and weight. The cecostomy wound, however, became ulcerated at its margin and granulation-like tissue was noted on the skin. (Fig. 2) This area increased rather rapidly producing sloughing. It bled readily and was covered with a sort of tenacious grey material in which numerous motile erythrocyte-containing amebae were found. On emetine injections and 1% yatren (Chiniofon) applications, healing took place very rapidly. The patient returned to his home in New Jersey and a letter from his doctor in New York, dated May 2, states that the strictures have greatly improved. "His bowels are moving normally and his general condition is that of a well man."

While he probably does not have a carcinoma, there are in our records two cases of carcinoma of the large bowel with concurrent amebiasis. One of these patients was treated for a considerable time for amebic dysentery and was subsequently found to have an inoperable carcinoma. Where a large amebic granuloma occurs in a patient past forty, with some obstructive symptoms, it may be exceedingly difficult to differentiate the condition from carcinoma, and a number of resections of amebic masses of the colon have been reported.[3] The defect, as visualized by the x-ray,[4] is usually more extensive and is often accompanied by other secondary deformities, but may be identical with that seen in carcinoma, especially in the cecum.

Another complication which this patient may still have is a late stricture of the sigmoid. Such a case is illustrated by the following history:

Miss G. W. (Case No. 290203), aged 23 years, entered the Presbyterian Hospital January 1, 1934. She gave the history of diarrhea beginning suddenly six years previously and lasting for about two years. She has had frequent similar attacks since then, until nine weeks ago when she had her stools examined and numerous amebae were found. Following the use of emetine and carbarsone, there was very rapid improvement. On admission to the hospital she was having great difficulty obtaining bowel movements.

On examination, the patient was undernourished. There was moderate tenderness over the entire abdomen with some rigidity. On rectal examination, a stricture which would not admit the finger-tip, was found four and one-half inches from the anus. Laboratory examination: Blood: hemoglobin, 70%; W. B. C., 7,120. Seven stools were positive for blood, some had mucus, and most contained amebae. A right rectus incision was made and an ileostomy done after suturing the proximal and distal limbs of the terminal ileum together in order to insure a complete diversion of the fecal current. The patient improved very rapidly after the operation. Even where the mass disappears and the patient's stools become ameba-free fibrous stenosis may require surgery to relieve the mechanical symptoms.

Another complication of amebiasis which may require surgery is represented by the following history:

On August 21, 1935, an internationally known opera impresario (Case No. 307773), entered the Presbyterian Hospital on the service of Dr. Irons. He brought with him a letter from a St. Louis physician stating that in all probability he was suffering empyema of the gall bladder and that immediate surgery had been urged but had been refused. In support of his diagnosis, the doctor sent some cholecystograms which showed no filling of the gall bladder. On admission, the patient complained of tenderness in the right upper quadrant, chills and fever. He stated that he had been in good health most of the previous 49 years of his life, but that for the past six weeks he has not been quite up to his usual self. He had first noticed tenderness in the right upper quadrant which was not at all severe, and was not accompanied by any sharp pain, but which was persistent. Three weeks previous to his entrance, following a dinner at which there had been more than the usual amount of imbibing, he developed a severe headache, and awoke the following morning with a fever of 103° F. A few days later he developed a sudden sharp pain in the left upper quadrant, well localized and soon disappearing, leaving no untoward effects. Following this he had several similar attacks none of which was related to eating or bowel movements. A week before admission, he had a severe chill followed by a high fever. There had been no nausea or vomiting. His stools had always been normal in color and consistency. Except for the fact that he had consumed the equivalent of a pint or more of whiskey daily for twenty years, his past history was unimportant.

Physical examination revealed no noteworthy changes except in the abdomen. The liver extended three fingers below the right costal margin. Its surface was

smooth, hard and tender. Both lobes were considerably enlarged, the right more than the left.

After admission to the hospital, the patient had several chills, his temperature going to 104° F. His leucocyte count never exceeded 13,600. Proctoscopic examination showed normal rectal mucosa. Stool examination revealed blood, pus and mucus, and motile Entamebae histolytica. Following the usual emetine therapy, the patient's temperature promptly became normal and the amebae disappeared from the stools. The liver swelling disappeared and the patient has again mounted the conductor's stand.

Such is the story of the all-too-common amebic abscess of the liver. Unfortunately the result is not always as dramatic or as happy. The frequency with which liver involvement occurs is difficult to determine although it is probably found much less often in the temperate regions than in the tropics. Craig[5] thinks that in this country the incidence does not exceed 5%. Males are affected several times more frequently than females—8 to 1 according to Ochsner and DeBakey.[6] Very few cases have been reported in individuals under 15, and only about 5% of cases occur after 50. The majority of patients are between the ages of 20 and 40. Excessive indulgence in alcohol, exposure, starvation and improper food, mental strain and traumatism over the liver all seem to exert a predisposing influence.

The morbid anatomy of amebic liver abscesses varies with the age and size of the abscess. The right lobe of the liver is involved much more frequently than the left. Craig found only nine solitary abscesses in 24 cases, and feels that the idea that amebic abscess is usually solitary should be abandoned. The wall of the abscess varies in thickness according to its age. Often it is irregular, shaggy and poorly defined, but a more or less dense fibrous capsule will be formed if the process continues long enough. The contents of the abscess, when uncomplicated by secondary bacterial infection, consist of thick, semi-fluid, reddish-brown or the so-called "chocolate sauce" material. Microscopically this is composed of shreds of necrotic liver tissue, degenerated liver cells, leucocytes, blood and motile forms of E. histolytica. If a secondary infection has occurred, the contents may be yellowish or a combination of the above picture with pus.

Symptoms vary greatly with the individual. While the absence of a history of diarrhea may be misleading, it should be remembered that Ochsner and DeBakey found that 41% in a series of 318 collected cases gave no history of previous diarrhea. Although liver abscess is usually seen within two months after ulceration of the colon, as many as 40 years may intervene between the primary infection and the development of the liver abscess. Pain, at first aching in character, later becoming piercing or stabbing, may be epigastric or referred to the shoulder or arm-pit. Sudden, severe pain occasionally occurs when an abscess ruptures. Craig noted that in 197 of 740 cases of amebic liver abscess, rupture occurred, demonstrating how frequently the condition has been overlooked by the clinician. Although Rogers[7] called attention to a pre-suppurative stage, which may last from two weeks to a month, most of the cases in this vicinity have been seen in the acute abscess stage. The fever, usually high in the acute stage, may disappear entirely in the long-standing case. The temperature as a rule is remittent, a decline being followed by profuse perspiration. Loss of weight and weakness are frequently progressive and marked.

Physical Findings: The liver is enlarged and tender. The abscess may produce enough enlargement to be visible externally. Restriction of the respiratory movements on the affected side, and rigidity of the abdominal muscles are usually noted. An increase in dullness on the affected side is frequently found due to the increased size of the liver or to a subphrenic abscess. X-ray findings are of great value, especially when they show an irregular contour of the liver surface or a bulging of the diaphragm, pointing into the lung field.

The most important laboratory findings are naturally the demonstration of the Entameba histolytica in the stools or in the material aspirated from the abscess. Leucocytosis, though marked, is not nearly as high as that which is characteristic of pyogenic liver abscess. The highest noted in ten cases in the Presbyterian Hospital was 19,300, the average being under 15,000. An increase in eosinophils, though definite, is usually not marked, and the percentage of polynorphonuclears is not increased.

The diagnosis usually is not difficult to make if the condition be kept in mind whenever a patient presents himself with an unexplained fever and tenderness in the region of the liver. In addition to the history, physical findings, blood-

picture and x-rays, aspiration of the typical debris will remove any shade of doubt from the physician's mind. In using the exploratory needle, care must be exercised to avoid the pleural cavity, and one should be prepared to proceed with surgical drainage should he find a pyogenic abscess.

The prognosis varies with so many factors that it is difficult to draw conclusions although Craig's mortality figures of 25 to 30% are probably fairly correct.

The treatment as already intimated, is primarily medical, and secondarily surgical. Open drainage has been abandoned by practically all tropical surgeons who have had a large experience with amebic liver abscesses, and they uniformly report an astonishing reduction in the mortality since adopting closed drainage. This frequently may be done by a large aspirating needle, although it may be necessary to employ a trocar on account of the thickness of the abscess contents. Aspiration must be done with care and always below the pleural space. It should not be attempted, except in case of emergency, until after medical treatment has been given a fair trial. Preliminary emetine therapy unquestionably lowers the surgical mortality. Lavage of the cavity is unnecessary and may be dangerous.

The most frequent complications are perforation into the subphrenic space with or without subsequent pleural or pulmonary pathology. I have seen one case of broncho-hepatic fistula and a number have been reported, always with a high mortality. Emboli from the lung may pass to the brain with a uniformly fatal termination, usually within a few days. Where the subphrenic space is involved, drainage by the posterior extra pleural route is preferable. Rupture of an abscess into the general abdominal cavity may be prevented by adhesion formation. Where no walling-off has occurred, the mortality is very high and drainage of little value.

Cutaneous amebiasis has rarely been reported except as an extension from a surgical fistula, such as a cecostomy or a drained liver abscess. Meleney and Meleney[8] describe a case of gangrene of the buttock, perineum and scrotum which was healed by a combination of radical excision, skin graft and emetine therapy, McMullin[9] cites a case of ulceration on the penis occurring in a Chinaman guilty of anal coitus. Local cleansing therapy, irrigation with iodine solution combined with renewed emetine treatment will usually clear up the superficial ulceration.

In conclusion, human amebiasis is a definite disease entity, almost as protean in character as syphilis. Its treatment is primarily medical.

Its close similarity to other common pathological diseases, such as appendicitis, cholecystitis and carcinoma of the colon, may lead to serious, preventable surgical mistakes.

Its complications require expert surgical judgment and the utmost care in management.

Whenever surgical therapy is indicated, it should be preceded and accompanied by medical therapy.

I want to thank the various members of the staff of the Presbyterian Hospital for permission to use their material.

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(DISCUSSION ON SYMPTOMS OF AMEBIASIS)

Dr. Richard H. Jaffé, Chicago: In opening the discussion of the papers on amebiasis, it may be of interest to discuss briefly the experiences of the Entameba histolytica in the human intestine. Protected by a resistant capsule the Entameba passes through the mouth, esophagus, stomach, small intestine, into the cecum and colon, down to the rectum. In the large intestine it loses its capsule, stretches out and starts to creep around. It secretes a dissolving substance, and with the aid of this substance forces its way into the intestinal wall. If the resistance of the host is high, the invasion soon is checked. There is an increased secretion of mucus and superficial ulceration. The mucus contains desquamated and degenerated epithelial cells and a few eosinophilic leukocytes. Single Leyden's crystals may be encountered. These changes usually do not cause any characteristic symptoms except for mild gastrointestinal manifestations. These are the

changes which occur in the carriers of Entameba histolytica and it seems that as far as amebiasis is concerned perfectly healthy carriers do not exist.

If the resistance of the host is insufficient, then the Entameba penetrates deeper and deeper into the intestinal wall. It passes beyond the mucosa and muscularis mucosae, into the submucosa, and evidently in the submucosa there are conditions that favor its propagation. Macroscopically, one finds nodular lesions in the colon which resemble furuncles. In the center of these nodules there is a small depression. The contents of the nodules is formed by a semiliquid material that is derived from the liquified tissues and is an ideal culture medium for the microorganisms which are always present in the intestinal content. Thus the specific amebic lesion soon becomes secondarily infected by the bacteria of the intestinal content and is transformed into an abscess that perforates into the intestinal lumen, and irregular ulcerations are formed. The ameba progress peripherally, soon to be followed by bacteria, and the ulcerations assume characteristic shape. The edges are deeply undermined with shaggy edges, and often fistulous tracts connect the ulcers with each other. I severe cases the whole intestine may become necrotic, and at autopsy it may then be impossible to remove the intestine intact, because as soon as one touches it, it breaks. The inner lining of the colon has become transformed into a dirty brown, shaggy material which resembles the skin of a buffalo. In some cases the changes extend above the ileocecal valve.

Wherever the Entameba histolytica enters living tissue it becomes surrounded by a clear space that results from the dissolving of tissue. In those cases in which the amebae force their way through the entire thickness of the intestinal wall and reach the serosa, peritonitis ensues which is the most serious complication of amebic dysentery. In other instances peritonitis is due to the perforation of the ulcers. I have repeatedly found at autopsy circumscribed amebic abscesses about the cecum, appendix or sigmoid colon. In these cases the perforation had led to a localized peritonitis that had been sealed off from the rest of the abdominal cavity.

Spreading by the lymphatics seems to be of little significance in amebic dysentery. The lymph nodes are seldom involved in amebiasis. If an involvement of the lymph nodes is found it is due to secondary infection. Evidently the amebae do not like the environment in the lymph nodes. In the blood vessels amebae are frequently found. Through the blood stream the ameba is carried to the liver. From what I have seen at autopsy, I am convinced that the great majority of liver abscesses are hematogenous. The amebic abscesses of the liver may be multiple or single. The latter is more common. The right lobe is involved in 70% and the left lobe in 20%, while in the remaining 10% both lobes are affected. In the early stages amebic lesions of the liver present themselves as areas of necrosis which are of moth-eaten appearance and dirty reddish brown in color. Progressing liquefaction and secondary infection transform the necrotic area into a frank abscess.

One point I want to emphasize. In some instances liver abscesses do not cause enlargement of the liver, and external examination may not disclose any abnormal findings. Yet, on incision or needling a cavity of considerable size may be discovered in the center of the lobe. When the amebic abscess of the liver extends to the diaphragmatic surface, a subdiaphragmatic abscess is apt to develop. The liver abscess may also break through the diaphragm into the pleural cavity. A pleural empyema following perforation of an amebic liver abscess is, however, rare. In the majority of cases the lung becomes adherent to the diaphragm prior to the perforation. If perforation occurs the abscess then breaks into the lung. The perforation may lead to a lung abscess or to a bronchial fistula. Pus is expelled into the bronchi and the amebae can be demonstrated in the sputum.

One complication of amebic liver abscess which I have repeatedly seen and which has seldom been mentioned in the lierature is the formation of pulmonary infarcts. These infarcts are secondary to a thrombophlebitis of a branch of the hepatic vein which is located near the liver abscess or into which the liver abscess has perforated. Keep in mind that the first clinical manifestation of amebic abscess of the liver may be a pulmonary infarct.

In other organs amebic abscesses are found occasionally, sometimes in the brain and in the kidney but these are extremely rare. In amebiasis there occur also lesions in the skin, particularly about the anus, about a colostomy or about the wound for drainage of a liver abscess. Again histologically we find in the skin the characteristic amebae surrounded by a clear space.

Dr. Eugene F. Traut, Chicago: Interest in amebiasis revived by the recent Chicago epidemic has led to meticulous examinations of stools in many patients whose symptoms might be even remotely related to those of amebiasis. So many publications have stressed the embarrassing and even serious errors due to overlooking of amebic infestation that the finding of amebae after a fervid search has been taken to explain the symptoms of many a baffling illness. The search for the underlying pathology often ended too soon with the triumphant finding of amebae in the stool.

Many a neurotic patient having sought for years the cause of a functional illness exults over the report of an inspired laboratory technician that Entamebae, presumably histolytic, exist in the patient's stools.

In my experience it would be well to halt this enthusiasm with the sober query, "Are the amebae really responsible for this patient's illness?"

Mr. H. had shown gross red blood in his stools for several weeks. He had also had some generalized abdominal pain. Complete examination including x-ray of the colon had resulted in the only positive finding of Entameba histolytica in his stools. No ulcers could be seen with the sigmoidscope. Complete elimination of the amebae by the usual management did not stop the

slight but constant bowel hemorrhages. A later x-ray showed definitely a carcinoma high in the sigmoid.

Mrs. M. had a history of abortions. She had low abdominal pain. Her findings suggested subacute pelvic peritonitis. Entameba histolytica was constantly present in the stools. With the sigmoidoscope the bowel membrane was found to be uninflamed. Following the use of emetine and chiniofon the amebae disappeared and did not return. The patient's pain, now determined to be due to subacute parametritis, persisted.

A man of forty years dined frequently in loop hotels. He complained of generalized abdominal pain, fatigue and pallor. He used ethyl gas exclusively in his large car. Due to some defect in the mechanism there was such a constant escape of vaporized gasoline into the interior of his car that it was necessary to keep his car windows open. He had a moderate hypochromic anemia and the excretion of lead in his urine and feces was constantly increased to ten times the normal figures. On one occasion the feces sent for quantitative lead analysis were accidentally sent to the bacteriological laboratory. The bacteriologist found Entameba histolytica in large numbers. Examination of several more specimens of stool showed Entameba histolytica to be constantly present. The patient could not recall having had diarrhea. Pus or blood were never found in his stools. No ulcers were seen in the rectum or sigmoid. Emetine and chiniofon were given. The amebae were abolished without any improvement. The patient recovered when his plumbism disappeared.

A widow, 36 years of age, had complained of generalized abdominal distress for many years. She had taken cathartics for a long period. Although she had lived in a downtown hotel in Chicago during the World's Fair she had never had diarrhea. The stools were usually long and narrow. She had never seen blood in her stools. Her symptoms were always exaggerated by fatigue or nervousness. Her distress was relieved by belladonna and bromides. She complained of doctors never finding anything wrong with her. She disliked being called "nervous." Her stools contained large amounts of mucus but never showed pus. Proctoscopic examination showed no inflammation as high as eleven inches from the anus. When a zealous worker in the clinic of a large medical school finally was able to culture amebae from the stool the patient was triumphant. At last someone had found the cause of her complaints. She had now a just reason for being ill. Antiamebic medication did away with the organisms. This treatment caused an exaggeration of her symptoms. The patient did not have amebic dysentery. She had an "irritable colon" and the amebae were merely coincidental.

An unmarried woman of thirty-two had complained of abdominal distress to numerous doctors for many years. They had been unable to find anything organic to explain her symptoms. She had never had diarrhea nor noted blood in her stools. Repeated x-ray and proctoscopic examinations had shown no pathology. Being tense and anxious, the diagnosis of "spastic colitis" or "irritable bowel" seemed entirely fitting. Entamebae histolytica were found to be constantly present in her feces. She was made more miserable by the anti-amebic medication. Her stools show no amebae on slides or in culture. Her previous complaints recur with fatigue, emotional strain or failure to adhere to the prescribed diet.

Summary. I have described instances of carcinoma of the colon, pelvic cellulitis, lead poisoning and spastic colitis or irritable bowel with coincident Entameba histolytica in the feces. In each case the finding of amebae masked or drew attention from the pathological basis of symptoms. Such errors are avoidable by recognizing and properly evaluating the carrier state.

The same tendency to overlook essential pathology occurs with a positive result to any other clinical or laboratory test. I have seen uremia and even pregnancy overlooked on the x-ray demonstration of a niche in the duodenal cap of a patient complaining of vomiting. In endocarditis or tuberculosis a positive Wassermann has served to confuse a diagnostician too laboratory conscious.

It is granted that true amebiasis may be associated with any other disease. It must also be granted that Entameba histolytica may be found in functional diseases symptomatically and etiologically entirely unrelated to the discovered amebae.

The finding of Entameba histolytica must not terminate the search for other pathology.

ALLERGY OF THE EYE, EAR, NOSE AND THROAT

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Introduction. For the last twenty years the discussion of anaphylaxis and allergy has become more and more familiar at medical meetings. While the foundations for the study were laid many years ago the real progress from a clinical point of view began during and just after the War. Men began to devote much time to this fascinating subject and clinics sprang up all over the country. Today there are allergy clinics in every large city of this country and many in smaller centers.

As the study began it concerned itself especially with hay fever and bronchial asthma but it was soon realized that allergy can strike almost any part of the body. The person who has allergic symptoms in one part of his body is apt also to have evidence of hypersensitivity in another organ. Thus, vasomotor rhinitis frequently precedes and accompanies bronchial asthma.

The diagnosis of hypersensitiveness is usually not difficult. In the first place, the patient fre-

Read before the Section on Eye, Ear, Nose and Throat, Eighty-sixth Annual Meeting, Illinois State Medical Society, Springfield, May 20, 1936.

quently has some other allergic manifestation; for example, if the complaint is asthma there is likely to be a history of previous eczema. Secondly, about 60% of the patients give a family history of some allergic condition, e. g., asthma, hay fever, urticaria, migraine, etc. In the third place, eosinophilia is a characteristic finding in allergy; there is usually an increased percentage of eosinophiles in the blood and equally important, there is also an increased percentage of eosinophiles in the secretions of the eyes, nose and bronchial tubes. This local outpouring of eosinophile cells is of utmost value as a diagnostic finding.

In the fourth place may be mentioned the protein sensitization, or skin, tests. In this connection I should like to state briefly my personal position in regard to the value of these tests. As most of you know, the value of skin tests is a subject for dispute. There are those who rely on skin tests almost exclusively; these individuals are handicapped, their results are poor because they are mere "skin scratchers," not clinicians at all; they are, in a sense, merely laboratory technicians. At the other extreme are the nihilists who condemn all skin tests; they, too, fail because they are not taking advantage of a very valuable diagnostic means. I class myself as a conservative, avoiding both extremes. I do skin tests, both cutaneous and intracutaneous, as completely as possible. In selected cases testing materials are placed in the nose or in the conjunctival sac. In contact dermatitis contact or patch tests are used. No matter what tests are used or what they show, one's common sense and one's clinical judgment must be exercised before a certain food or other substance is found to be the definite cause of a certain clinical condition.

It goes without saying that a searching history of the complaints of the patient is as essential in the care of allergic individuals as it is in those who are not hypersensitive.

ALLERGY OF THE EYE

The eye is a common seat of allergic manifestations. Itching, photophobia and lacrymation are outstanding symptoms in ordinary pollen hay fever. The early type of hay fever is due to the pollen of trees; a later season is caused by grass pollen; a late group of cases is due to pollen from weeds, especially ragweeds. These have been discussed so frequently that we shall here dismiss the subject of true pollen hay fever with the statement that it is probably the most frequent cause of eye allergy.

Excluding the conjunctivitis associated with true hay fever there remain two other types of conjunctivities for consideration from the allergic point of view. One of these occurs in spring and summer and is called "vernal conjunctivitis" or "vernal catarrh." It might well be called "seasonal allergic conjunctivitis." The other type is found at any time of the year and may be termed "non-seasonal (allergic) conjunctivitis."

Vernal Conjunctivitis. "Vernal conjunctivitis" is the fairly frequent condition and is characterized by an itching inflammation of the eyelids, associated with photophobia and lacrymation; mucous strands are usually present and the eyes tend to stick together in the mornings. The secretion usually contains eosinophiles. The onset varies a little but usually occurs on or before the first of May; it may or may not last until cold weather. It usually disappears entirely until the next year, but in some cases the follicles of the mucosa tend to remain inflamed after the season is over. Unfortunately, in a few patients there is a tendency for these follicles to persist as a more or less permanent structural change that looks like the cobblestones found in trachoma. In fact, trachoma has been frequently confused with vernal conjunctivitis.

Lehrfeld[1] reports the pathology of vernal catarrh as follows: the epithelium swollen and irregular, definite connective tissue proliferation, with sclerosis and hyalinization, glands full of eosinophiles and lymphocytes, and mast cells and eosinophiles throughout the stroma.

Wood[2] in his book on "Allergy and Immunity in Ophthalmology" points out that the pathology of vernal conjunctivitis has two forms. The first is similar to a phlyctenule, a form due to an allergic reaction of a sensitized conjunctiva to a specific allergen. The second form is characterized by connective tissue proliferation and cellular infiltration of the follicles, a reaction quite comparable to that occurring in chronicle bronchial asthma and chronic eczema. The first form is, therefore, that characteristic of ordinary hay fever; the second that found especially in long-standing eczema.

Is vernal conjunctivitis an allergic condition? There is a difference of opinion on this point. Lehrfeld[1] reported that 10% of his patients with vernal catarrh also had other allergic manifes-

tations and in 21% there was a definite family history of allergy. Thirty per cent. of his 87 cases gave positive skin tests by the scratch method; eosinophiles were found in 40 of 69 cases. Townsend,[3] Mamoli[4] and Weinstein[5] report the frequency of associated hay fever, vasometer rhinitis or bronchial asthma. Fort[6] reported 19 cases of vernal catarrh, all sensitive to pollen, 15 to spring pollens, 4 to fall pollens. Lemoine[7, 8] found positive pollen tests to 12 of 13 cases. I have seen several cases of vernal catarrh which gave positive cutaneous tests to pollen and which later developed hay fever. One of these had the cobblestone type of conjunctivitis and developed a severe corneal ulcer with subsequent opacity; for some time he was thought to have trachoma.

The results of treatment from the allergic point of view have not been very satisfactory. Fort[6] reported 15 cases with one cured and 13 improved. Other reports have been inconclusive. In my patient who developed the corneal ulcer, speedy improvement followed removal to a pollen-free room. Avoidance of pollen seems distinctly advisable in severe cases. If, for example, ragweed pollen seems to be the cause of a severe conjunctivitis with corneal ulcer the patient should either be confined in a room the air to which is supplied through a pollen filter or he should be sent to the far north.

Against the idea that vernal catarrh is allergic are the following points: Pascheff[9] found evidence that vernal conjunctivitis may be associated with latent pulmonary tuberculosis. Another argument lies in the fact that vernal catarrh frequently lasts a year or two and then disappears which rarely occurs in pollen hay fever. Then again, its appearance in late April or early May, when only the pollen of trees is in the air in this vicinity, demands that the cause, if pollen, must be a tree pollen, yet, skin tests, when positive, are usually positive for grass pollens, not tree. Thus, it may be stated that vernal conjunctivitis has not been definitely proved to be allergic. Skin tests should, however, be carried out in all cases.

Non-Seasonal (Allergic) Conjunctivitis. There is no doubt that there are many cases of conjunctivitis that are definitely due to sensitization to some substance other than pollen. The symptoms come on at any time of the year when there is contact with a specific allergen, such as house dust, orris root, feathers, etc. Thus, Bab[10] reported 25 cases of allergic conjunctivitis, treated by desensitization with the specific allergen. Seven of these were complicated by hay fever, vasomotor rhinitis and bronchial asthma. Eleven cases responded favorably to desensitization to specific and non-specific substances. Woods[11] reported a case due to corn dust; Blake[12] one to cat hair; Balyeat and Bowen[13] a case due to feathers and another due to tomato, onion and egg with relief on avoidance of these foods. Parlato[14] reported a patient with corneal ulcers who gave positive skin and ophthalmic reactions to orris root, to which she was exposed daily in cosmetics; improvement followed a course of injections of an extract of orris root. Parlato emphasizes an important point, namely, that early recognition of hypersensitiveness in many cases of chronic conjunctivitis may help to prevent the formation of corneal ulcers and the subsequent impairment of vision. Roy[15] also reported a severe case of edema of the conjunctiva from orris root in a powdered shampoo.

Bedell[16] in his article on stereoscopic fundus photography has some beautiful photographs of two cases which he considers allergic. His first may be open to argument but the second case probably not as it followed an injection of tetanus antitoxin and the demonstrated retinal petechiae and edema immediately preceded the appearance of serum urticaria.

As far as treatment of seasonal and non-seasonal allergic conjunctivitis is concerned, it is important to remove the specific cause as far as possible, whether it be pollen, orris root, house dust, feathers or some other antigen. It would seem advisable also to attempt desensitization where complete removal of the cause cannot be carried out, as in pollen or orris root. Though the results of such treatment are not as yet known in sufficient numbers one has everything to gain and little to lose by trying such treatment.

For local treatment avoidance of light and various solutions and compresses are indicated. Dedimas[17] believes that the best treatment consists in injections of 1:2000 epinephrin solution subconjunctivally.

Contact Dermatitis of the Eye. In addition to conjunctivitis due to pollen and to other antigens there is another important group of eye conditions, those due to contact with various ir-

ritating substances. These cases are analogous to the ordinary contact dermatitis seen by the dermatologist. Patients with contact dermatitis are not allergic in the ordinary sense of the term; they have no special family history of allergy; eosinophilia is not characteristic; ordinary cutaneous and intracutaneous tests with protein extracts are negative; passive transfer cannot be accomplished as it can with hay fever or bronchial asthma. Contact dermatitis is, however, characterized usually by a positive test with the contact or patch test. This is done by laying the suspected material against the skin of the arm or back; in a day or two, or less, if redness and vesiculation occur a positive reaction is indicated.

Many cases of contact dermatitis of the eyes have been reported; cosmetics have been especially incriminated. Thus, Neuschuler[18] reported severe symptoms from the use of an eyelash preparation called "Rimmel" with relief on stopping its use and re-appearance of symptoms with subsequent trial in one eye. He also quotes cases seen by other men from application of henna and other substances used on the eyelashes. Rattner[19] had a case due to Godfrey's dye applied to the eyebrows and eyelashes; he also had one due to a wave lotion; another to a face lotion; and a fourth to a cold cream. Balyeat and Bowen[13] had a patient with an acute conjuctivitis due to "Lash Lure," and another due to a hair oil. Koutseff[20] reported one due to atropine solution dropped in the eye. Many other patients have had conjunctivitis from atropine. All of these patients were relieved on removal of the cause.

The problem is one of scientific detective work. A careful history plus patch testing are very helpful.

Other Eye Conditions. The question of whether cataracts may be due to sensitization is much disputed and time will not permit discussion. Likewise, the relation, if any, between sympathetic ophthalmia and allergy is very indefinite. Those especially interested would do well to consult Wood's monograph.[2]

Angioneurotic edema may strike any part of the body but seems to have a special predilection for the eye. It apparently rarely involves the throat. Its etiology needs careful study but a food history and diet trials are an aid. Skin tests are apt to be disappointing but should be tried. Common drugs like quinine and coal-tar products are frequent causes.

MENIERE'S SYNDROME

Recent work indicates conclusively that allergy is an important and perhaps the sole cause of Ménière's syndrome. The symptoms described by Ménière eighty years ago were thought to be due to a hemorrhage or effusion into the semicircular canals of the ear. Yandell[21] in 1933 had a male patient, 38, who had periodic attacks of intense vertigo, tinnitus, nausea and vomiting for fourteen years; the attacks came on suddenly and violently; the patient was sometimes hurled to the ground as though struck by a heavy object. He was even thought to be epileptic. He would be unconscious for a short time and vertigo and headache would then follow before the symptoms would finally cease. This patient also had urticaria. The family history for allergy was negative. He was always worse in crowded places, e. g., barber shops, theatres, dances, etc. He had had no previous ear trouble. Vision was almost normal. Skin tests showed a positive intradermal two-plus reaction to house dust and a four-plus positive test to a 1:500 dilution of orris root. These two reactions brought on severe headache, nausea and vomiting and the patient had to lie down to keep from falling; the symptoms lasted six hours. Desensitization to orris root was started, beginning with weak doses and orris root was avoided as much as possible. Improvement was so marked that subsequent visits to crowded places did not cause trouble. Yandell believes that the symptoms were due to an edema within the labyrinth and, as is well known, edema is characteristic of allergy. The edema, of course, could act as would a hemorrhage.

Malone[22] also reported a case of Ménière's syndrome in another man who had had urticuria and who also had his main trouble while in crowded places where exposure to orris root was inevitable. Orris root gave a four-plus intradermal test and desensitization by injections of gradually increasing amounts of orris root extract has brought about great improvement. On one occasion an overdose caused vertigo, headache and nausea; this fact strongly strengthens the presumption that contact with orris root caused the syndrome.

In addition to these two cases, Urbach and Wilder described the occurrence of vertigo of the Ménière's type associated with urticaria, angioneurotic edema and gastrointestinal symptoms following the injection of horse serum. The eat-

ing of pork re-excited the attacks; a milk diet and specific peptone preparations controlled the symptoms. A low intake of sodium in the food and administration of ammonium chloride by mouth has been found of aid.[23] Foldes[24] believes that Ménière's disease is due to a temporary local liquid retention or a disturbance in water and mineral metabolism.

From these data it seems logical, because of the serious nature of the condition, to have all cases of Ménière's disease subjected to a complete examination which should include a survey from the allergic point of view.

NASAL ALLERGY

In the few minutes left I can merely touch on the subject of allergy of the nose. A large percentage of patients seen in the practice of a rhinologist is definitely allergic. Just as the institution of patch, or contact, tests has revolutionized dermatological practice so will the routine examination of nasal secretions change the old methods of treatment. Hansel,[25] to whom great credit is due, in his book on "Allergy of the Nose and Paranasal Sinuses," just published, has studied the literature very extensively; he has examined nasal secretions of normal, infected and allergic individuals. The nasal secretions are gathered simply by blowing the nose on a waxed paper or cellophane handkerchief. After drying, the material is stained as for an ordinary differential blood count, using Wright's or Giesma's stain. The percentages of polynuclear neutrophiles and eosinophiles are determined. Hansel points out that in normal nasal secretions cells are few; in infectious cases, as in the ordinary "cold," the secretions contain large numbers of polynuclear cells; whereas, in the allergic nose the eosinophiles vary from about 4 to almost 100%. If an allergic individual contracts an ordinary non-allergic rhinitis or "cold" the eosinophiles lessen or disappear temporarily only to return later.

The examination of nasal secretions should be a routine procedure. If you do this you will probably find that at least a third of your patients with nasal symptoms are allergic. If then you examine these individuals from an allergic point of view you will be placed in a better position to benefit your patients.

The question of nasal polyps is important. That they are closely related to allergy is indicated by the work of Kern and Schenk[27] who found that all patients with mucous polypi gave a history of allergy and that eosinophiles predominated on histological examination of the excised polyps. Watkins[28] noted that nasal polyps disappeared as a result of appropriate therapy. While this is not an uncommon occurrence disappearance does not, of course, always occur.

Surgery of the nose in allergic individuals is indicated for severe infections or obstructions where more conservative measures have failed. All too frequently the results from surgery are but temporary; after a few months or less the symptoms and the local eosinophilia are apt to return. In addition, I have seen severe bronchial asthma occur repeatedly after nasal surgery; this possibility must be taken into account.

Pollen Hay Fever. Concerning ordinary pollen hay fever, the best treatment to date remains the injections of the appropriate pollen extracts. These injections should be given in larger dosage, I believe, than usually administered, with due regard to reactions. Bulk solutions are much the best as they can easily be adapted to suit the individual case. Thorough skin tests not only for pollens but also for foods, feathers, etc., are of great aid. Removal, for example, of foods which give positive skin tests helps the results of treatment. The perennial treatment of hay fever has become an established method. Its results are at least as good as those obtained by the usual preseasonal method; furthermore, it has been noted by many that patients who receive injections of a pollen extract throughout the winter seem to be protected to some extent from ordinary "colds."

Ionization. Before concluding let us consider the desirability of ionization of the nasal mucosa for hay fever and vasomotor rhinitis. There seems to be a wide difference of opinion as to its value. Following the treatment Alden[29] reports a complete return of the mucosa to normal but Hollender[30] states that ciliated epithelium is replaced by a non-ciliated cuboidal or stratified type without marked fibrosis. Hansel[26] states that the immediate effect of ionization is the formation of a serofibrinous exudate which may be removed in three to five days. The nasal secretion shows chiefly neutrophiles with a few eosinophiles. After the complete disappearance of the exudate the mucosa looks dry with scanty secretion that shows some eosinophiles in spite of the relief of symptoms. Alexander[31, 32] believes the

relief obtained is due to a local non-specific desensitization similar to that obtained by the use of carbolic acid, trichloracetic acid, diathermy or actual cautery. The relief of symptoms on both sides of the nose following ionization of one side further suggests this non-specific effect. From the immunological point of view Alexander has shown that when positive skin tests were obtained before ionization they persisted after ionization. Likewise, if the procedure of passive transfer demonstrated reagins in the blood these persisted after ionization.

Alexander concludes that hay fever patients ionized before the season do poorly; he believes better results follow injections of pollen extracts. Three of his hay fever patients who were ionized had relief from nasal symptoms but developed asthma for the first time. Parlato[33] also reported that following ionization two hay fever patients developed asthma for the first time. Both Alexander and Parlato, however, stated that in the group of patients with negative skin tests and with an absence of reagins in the blood, nasal ionization proved to be very effective; and Hansel seems to agree with this statement. Ramirez[34] ionized 100 cases of seasonal hay fever and 25 cases of perennial rhinitis and was much dissatisfied with his results in both groups. House and Gay[35] treated 20 individuals with allergic and non-allergic symptoms. Three out of five non-allergic cases of rhinitis were improved. In the remaining 15 the results were, for the most part, poor.

In contradistinction to the above, Alden[29] obtained complete relief in 63% of 416 uncomplicated hay fever patients; only 8% had complete failures. In 27 asthmatics he reports complete relief in 37%, with failure in 44%. Alden states that 80% of cases of vasomotor rhinitis received from 80% to 100% relief. Hollender[36] has been using zinc sulphate ionization for more than twelve years and reports good results in vasomotor rhinitis. In a later article by Hollender and Gorin[37] from 50% to 70% relief was obtained by zinc ionization in patients with vasomotor rhinitis. Warwick[38] reported that all but one of 40 patients have been entirely relieved of their symptoms for more than one year and 19 of them for more than three years. Among other methods of treatment phenol[39] and radium[40, 41] have been used; Bernheimer noted that the results of application of radium in perennial cases was good but that in 12 patients with seasonal hay fever failure resulted in all.

CONCLUSIONS

1. The eyes and the upper respiratory tract are especially prone to the disturbance of hypersensitivity.

2. Early recognition of possible allergy of the eye may prevent corneal ulcers and subsequent opacities.

3. Ménière's disease is probably allergic.

4. The study of nasal secretions in nasal cases should be routine. A high percentage of eosinophiles indicates allergy and treatment in such cases should be from both rhinological and allergic points of view.

5. The best treatment for hay fever is a series of injections of the appropriate pollen extracts.

6. The value of nasal ionization is still under dispute; its results in pollen hay fever usually are not good; in vasomotor rhinitis some workers report considerable success.

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DISCUSSION

Dr. A. R. Hollender, Chicago: This timely and interesting paper is comprehensive in scope but leaves open for controversy a number of important points. I do not propose to argue them, but I should like to emphasize my point of view, first with reference to the diagnostic phase, and second, with the therapeutic aspects.

I have been struck with the variability of skin reactions from diagnostic tests, especially as concerns the sites of the body. In other words, misleading information from diagnostic skin tests has often led to a confusion in estimating the degree of hypersensitiveness because all the tests are usually made on one certain part, like the arm. When these same tests are performed elsewhere on the body a different picture presents itself. Alexander had emphasized this fact and has stated,, for instance: "The degree of reaction varies at different sites of the body. When it is large on the back and abdomen, it is smaller on the arm and often negative on the leg. Finally, and this is discouraging, positive reactions occur that have no meaning whatever." Alexander aptly evaluates these findings when he says: "In view of these facts, positive skin reactions other than in hay fever must be regarded with caution, and negative reactions as by no means ruling out the allergens employed." It behooves us to regard diagnostic skin tests with less importance than we have in the past. Certainly we have learned that the interpretation of these tests and the correlation of this interpretation with the clinical facts are along the lines of more rational thinking.

We now appreciate more and more the fact that individuals are often sensitive to the bacteria of infection. This is a step forward, but alters little our therapeutic program. A patient with an acute or chronic maxillary sinusitis who is sensitive to the re-absorption of the pus in the sinus or in the nose, will not usually yield to allergic therapy whether by vaccine or other means, but requires rhinologic treatment to clear up the infection. The rhinologist has always recognized this and has repeatedly cured up sinus patients without even considering that an allergic condition may be present. The advance in this field, then, has been in diagnosis rather than in therapy.

Whenn it comes to a consideration of the problem of allergy, both the laity and the profession are most eager to hear what the essayist has to say about hyperesthetic rhinitis, asthma and seasonal hay fever. The allergist naturally claims substantial progress in the therapy of these conditions, but I wonder whether the rhinologist is willing to agree with this claim. I am utterly convinced that the allergist has accomplished little in the specific treatment of hyperesthetic rhinitis, and I am not so certain that his accomplishments in asthma and seasonal hay fever are what they are generally purported to be. I make these statements advisedly because of the enthusiasm manifested by the profession as a whole whenever some now non-specific procedure is advanced.

I am in strict adherence with the view that theoretically specific therapy is the ideal, but I am still waiting to be convinced that the results with specific therapy are superior to our non-specific methods. My experience with ionization therapy—a non-specific procedure—has been more satisfactory than with any other treatment of hyperesthetic rhinitis. My own series of cases as well as those of numerous other workers show from 60 to 70% of patients who have enjoyed prolonged palliation of symptoms. In certain types of asthma, the results are sometimes dramatic. I recently reported the results in two cases of long standing which had resisted every other form of treatment.

In closing, I ish to go on record as urging a closer co-operation between allergist and rhinologist. Too many patients are observed who are placed on so-called injection treatment without adequate rhinologic examination. The presence of local pathologic processes must always be considered as an associated etiologic factor, and in fact, the eradication of local nasal or sinus disease has cured some patients who have spent years exclusively under allergic management.

Dr. O. B. Nugent, Chicago: I would like to ask the essayist to what extent we can depend upon the eosinophiles found in the mucous membrane as a diagnostic factor, and is this misleading? Are there some cases in which the eosinophiles are quite prevalent in which there are no other indications of such a condition being present?

Dr. Leon Unger, Chicago (closing): The eosinophile count of the nasal smear is very accurate. Routine examination of the watery fluid that drips out of the nostrils of allergic individuals will show, as a rule, from 4% to as high as 100%. In such cases there will probably also be a family history of allergy and positive skin tests.

Hansel's new book, which he has been writing for six years, is, I believe, the best book on the subject. Hansel is a nose and throat man in St. Louis. His book pays special attention to allergy of the nose and sinuses.

I want to apologize to Dr. Duntley for not sending him a copy of this paper. Answering Dr. Hollender, I cannot agree with him regarding skin tests when he states that they are of practically no value. It is true that this point of view is shared by many other men in the profession; even an occasional allergist will be found who puts very little faith in skin tests but, by and large, the men who do allergy work have found that when the skin tests are properly done and are correlated clinically they are of immense value in allergy, not only of the eye, nose and throat, but of allergy elsewhere in the body. Experience is necessary to de-

termine the degree of positiveness of a skin test, whether it is done on the back, the arm, or the thigh. As a rule, those done on the back are a little larger than those done on the arm or thigh. Any intradermal method of doing skin tests should be preceded by the scratch tests. If this is not done the intradermal tests are apt to be misleading unless carried out by a competent allergist.

The question of bacterial allergy is very much in dispute. There undoubtedly is such a thing but the process is different. In bacterial allergy the positive reactions come on after a long period of time; in testing with pollens, epidermals and foods the reactions occur within twenty or thirty minutes.

I also disagree with Dr. Hollender on his results of treatment. I do not believe that pure rhinological treatment will give as good results as will be obtained from a combination of rhinological and allergic treatment. It is true that patients very often are greatly improved after their first nasal operation. It is likewise true that many of these have to be operated on again and sometimes as many as four or five and even six times. Each operation is followed by less and less favorable results.

It is a simple thing to make a nasal smear and if eosinophiles are found in moderate or large numbers the patient should be completely skin tested and I am sure that the results of treatment will be much better than if only nasal treatment is followed.

Polyps are, I believe, the result of allergy, not the cause. I was glad to hear that Dr. Hollender was able to cure two cases of asthma with ionization.

Let there be closer cooperation between the men doing rhinologic work and those doing allergy.

SURGERY OF THE GALL-BLADDER AND BILE DUCTS

CHARLES B. PUESTOW, M. D.,
CHICAGO

In attempting to evaluate the rationale of the various surgical procedures which are commonly performed upon the extrahepatic biliary tract it is important for us to have as thorough a knowledge as possible of the normal physiology of this part of our anatomy, and the changes in physiology which occur in the presence of disease and which follow surgical intervention. Investigative work, carried on both in man and animals, has given us in recent years much valuable information.

We know that in animals possessing a normal gall-bladder there is a sphincter mechanism at the duodenal end of the common bile duct called the sphincter of Oddi, which maintains at all times enough resistance to the flow of bile into the duodenum to elevate the intraductal pressure. In the dog the intraductal pressure varies from 100 to 200 mm. of bile. During the fasting state this sphincter mechanism completely stops the discharge of bile into the intestine and forces it into the gall-bladder, where it is concentrated and stored. The stimulus produced by food causes some relaxation of this sphincter mechanism, and contraction of the gall-bladder, so that bile is evacuated into the intestinal tract, where it aids digestion. We believe this same type of physiologic response occurs in most animals possessing gall-bladders, as well as in man. In animals which do not have a gall-bladder, however, we find a different type of physiologic response; in this group there is very little sphincter activity at the duodenal end of the common duct, and as a result the intraductal pressure is always very low. In the fasting state what little bile is formed by the liver is not held back entirely in the duct, but slowly dribbles through the orifice into the intestine. We have been unable to determine why nature provided some species of animals with gall-bladders and others without them. It is hard to explain why one of such closely allied species as the pocket-gopher and the striped gopher, or the rat and the mouse, or the horse and the deer, should be provided with a gall-bladder while the other has none. The presence or the absence of a gall-bladder cannot be explained by habits of food, environment, or relationship of species.

In a series of experiments the intraductal pressure in the common bile duct of dogs with normal intact gall-bladders was determined; cholecystectomy was performed at a later date and the pressure again determined. It was found that there was a considerable loss of sphincter tonus, with a very low intraductal pressure resulting. In the series of patients about to be reported the gall-bladder was removed and the common bile duct drained in forty cases. Intraductal pressures within the choledochus were determined in these patients, and in all cases and under all observed conditions the pressure was not sufficiently great to force bile more than 1 cm. above the level of the anterior abdominal wall. We would expect intra abdominal pressure to maintain the level at the abdominal wall. Therefore, it is apparent that, at least in both man and dog, removal of the gall-bladder is fol-

Read before Section on Surgery, Eighty-sixth Annual Meeting of the Illinois State Medical Society, Springfield, May 20, 1936.

lowed by a loss of sphincter tonus at the duodenal end of the choledochus and a marked reduction in the pressure within the common duct. Removal of the gall-bladder apparently alters our physiology to correspond to that of animals which normally do not have a gall-bladder. I believe this change in physiology is partly responsible for the relief of symptoms in many patients in whom the amount of gall-bladder pathology is minimal. We know that in the presence of disease of the gall-bladder this organ loses its power of concentrating bile, and of contracting. If the sphincter mechanism at the duodenal end of the common duct is active and the gall-bladder is not able to concentrate the bile within it, and thus, by removing water from the bile, keep the pressure below the secretory pressure of the liver, which is about 300 mm. of bile, it is conceivable that distress can be produced by an overly great pressure within the duct.(Considerable has been written about the syndrome spoken of as biliary dyskinesia. It consists of biliary distress and colic in individuals with very little, if any, pathology. One explanation has been a simultaneous contraction of the gall-bladder and of the sphincter of Oddi so that bile cannot pass into the duodenum, and the pressure within the duct is increased, producing pain. If sphincter tonus is lost, or greatly diminished following cholecystectomy so that the intraductal pressure is low at all times, pain produced by increased tension will be eliminated.)

To determine further the anatomic effect of gall-bladder disease and of cholecystectomy upon the common duct the circumference of this structure was measured in a large series of routine autopsies. The average normal circumference, at various ages, was determined and plotted. It was found that where cholecystitis without stones existed the circumference of the common duct was only very slightly greater than that of the normal duct. Where cholecystitis with stones, but without a history of jaundice, existed, the circumference was slightly greater, but not markedly so. However, in those individuals in whom the gall-bladder had been previously removed the duct was greatly dilated.

If cholecystectomy is followed by loss of sphincter tonus and a diminution in intraductal pressure, it would be difficult to explain this dilatation by increased tension within the duct. It is possible that this increase in diameter may result from a loss of tonus of the duct wall, as well as that of the sphincter following cholecystectomy. The theory has been expressed that a loss of tone of the duodenal sphincter would permit regurgitation of the duodenal contents into the bile duct, and promote an ascending biliary infection. This apparently does not occur, as in no case in which the choledochus was drained was any duodenal content observed to be discharged through the T-tubes. With an open draining tube, minimizing intraductal pressure, one would expect to note such a drainage at this time were it to occur. We know also, from experimental evidence in animals, that the duodenal pressure can be greatly increased and still the contents will not drain out through the choledochus. Further evidence to support the absence of regurgitation of the duodenal contents into the bile ducts following cholecystectomy is the fact that following a barium meal, in a cholecystectomized individual, barium is not seen within the duct. This is probably due to the oblique course of the common duct through muscular coats of the wall of the duodenum.

In summary, therefore, we may say that evidence indicates that in normal individuals with an intact gall-bladder a sphincter mechanism exists at the duodenal end of the common bile duct which maintains a constant and fairly high intraductal pressure. The purpose of this pressure is probably to force bile into the gall-bladder and aid in the absorption of water from it. The ingestion of food causes a partial relaxation of the sphincter and a contraction of the gall-bladder, emptying the bile into the intestine. In the presence of gall-bladder disease, with a gall-bladder unable to do its work, if the sphincter mechanism persists we may have distress from increased intraductal pressure. Following cholecystectomy the sphincter mechanism at the duodenal end of the common duct is greatly diminished, causing a lowered intraductal pressure, a free-flowing of bile into the intestinal tract, and a relief of any disturbance which may result from tension within the duct.

It is on the basis of this introductory evidence that I feel that cholecystectomy is physiologically a sound procedure in the presence of gall-bladder disease. I would like now to summarize a series of two hundred operations for benign biliary tract disease. (See Table.) Of this group forty, or 20%, presented such symptoms as would deem

it advisable to explore the common duct. Nine, or 22.5%, of this group, had had previous biliary tract surgery. Four patients in this group had stones in the choledochus, with no history of jaundice. The indications for exploring the common duct were as follows: a definite history of jaundice, stones palpable within the common duct, a dilated and thickened common duct, and especially if the cystic duct itself was dilated. Stones were found in 60% of the ducts explored. Although the percentage of ducts opened may seem high, routine autopsy studies have shown that where stones are present in the gall-bladder they can also be found in the common duct in 25% of cases. Therefore, if we do not explore suspicious cases we will leave many stones behind in the common duct to cause subsequent trouble.

Furthermore, I do not believe that merely opening and draining the common duct after exploration appreciably increases the mortality of the operation. In this group of forty patients there were three deaths—a mortality of 7.5%. Although this was a higher rate of mortality than that associated with simple cholecystectomy, this can be expected because of the far greater risks we are dealing with in this type of surgery. One of these patients who died had multiple liver abscesses at the time of operation, and died of a resultant toxemia. A second patient had been jaundiced for nearly two years, and although she recovered from the procedure she gradually declined and died in several weeks of hepatic insufficiency. The third patient had an extensive pancreatitis, and died of a subsequent peritonitis. I believe that the added risk involved in exploring the common duct, where indicated, is less than the risk associated with the leaving of stones in the common duct.

Of the remaining 160 patients surgery was confined to the gall-bladder in seventy-one. In seventy of these the gall-bladder was removed, and in only one instance was it drained. In the other eighty-nine patients the gall-bladder was removed, and some other surgical procedure performed at the same time. This consisted, in most instances, in removal of the appendix, repair of a ventral incisional hernia, and an occasional plastic operation on the duodenum. In this group there were two deaths—a mortality of 1.1%. Thus, for the entire two hundred patients, including the forty in whom choledochostomy was performed, there were five deaths, or a mortality of 2.5%.

The value of any surgical procedure depends, for final analysis, upon the results obtained by it. In this series 88% of those individuals who could be carefully traced after operation obtained a very satisfactory result. They were relieved of their pain and dyspepsia, either entirely or to a high degree, and had no subsequent biliary tract disease. Another 5% were improved, but continued to have some distress suggestive of biliary tract discomfort. All of this group, however, stated that they experienced sufficient improvement to justify their operation.

We learn more from our poor results than we do from satisfactory ones. In this series of cases eight, or 4.4%, were not improved by the surgical procedure carried out. A careful analysis of these cases will help to explain their unimprovement. They consist largely of individuals who have been under observation, for one ailment or another, for many years. In no instance were the histories typical of cholecystic disease. In two individuals—one with an intractable dermatitis, and the second with a severe asthma—a search for foci of infection revealed a pathologic gall-bladder, and cholecystectomy was requested, in the hopes that it might be followed by an improvement in their main complaint. Neither patient was improved.

The remaining patients gave a history of dyspepsia of an indefinite nature. In general they were nervous individuals, with a recognized functional element in their stories. Several had had one or more previous abdominal operations, without relief. In the remainder, radiographic studies revealed a pathologic gall-bladder. All of these patients failed to respond to long periods of medical management, and were finally operated upon in the hope of some improvement; these hopes were not realized.

After carefully analyzing the entire series of patients I am of the opinion that the most important determining factor in the proper therapy of biliary tract disease is an accurate and complete history. When a history is typical of gall-bladder colic and biliary dyspepsia, even though radiographic findings may be negative, I believe cholecystectomy is indicated. On the other hand, where the history is not convincing in the establishment of a diagnosis of biliary tract disease, even though the x-ray may report

a pathologic gall-bladder, cholecystectomy will not necessarily relieve the patient's symptoms. I also believe that in the presence of a diseased gall-bladder, and a patent common-duct, cholecystectomy is the operation of choice. This opinion is based both on the result of physiologic investigation and the end results of clinical surgery.

Included in this group of cases are fourteen instances of acute cholecystitis. There has been much controversy in recent medical literature as to the time of operation upon an acutely inflamed gall-bladder, and a patent common-duct, cholecystitis to acute appendicitis, and suggest immediate surgery; others permit a partial subsidence of the disease, delaying operation for a few days to two or three weeks; still others favor a delay of months, if possible. Twelve of these patients were operated upon in five to ten days after the onset of their attack. In this time they were treated by rest and intravenous glucose, and in most instances their temperature and leukocyte count had subsided to normal. At the time of operation their condition permitted removal of the gall-bladder; all recovered with an average post-operative hospital stay of twelve days and an uneventful convalescence. The one choledochostomy in this series presented at operation an acute suppurative cholecystitis and an extensive pancreatitis, with fat necrosis. This patient recovered, but was in the hospital forty-three days after operation. The fourteenth patient had, besides an acute cholecystitis, intra-hepatic stones blocking off a large portion of the liver, which was studded with abscesses. This patient died of toxemia forty-eight hours after operation.

If a patient is carefully observed, I do not believe that a few days adds greatly to their risk, and it does improve their condition to the extent that in most instances the gall-bladder can be removed.

25 E. Washington St.

TABLE I. SUMMARY OF OPERATIONS AND RESULTS

Benign Biliary Tract Disease	Cholecystectomy	Cholecystectomy plus	Choledochostomy	Cholecystostomy	Total or average	Percentage
Number of patients.....	70	89	1	40	200	....
Age onset of symptoms..	36	35	29	39	36	....
Age at operation.....	42	40	35	45	42	....
Previous biliary surgery.	7	2	..	9	18	9
Stones present	47	63	1	34	145	72.5
Av. p. o. hosp. days....	14—	13—	43	17	14	....
Results:						
Satisfactory	57	71	1	33	162	88
Fair	3	5	..	1	9	5
Poor	5	2	..	1	8	4.4
Unknown	4	10	..	2	16	....
Hospital deaths	1	1	..	3	5	2.5

DISCUSSION

Dr. J. C. T. Rogers, Urbana, Ill.: We all have done cholecystectomies more or less routinely in the process of exploring the biliary passages. There are several valuable practical points in this connection that have been suggested in this paper. The alterations in anatomy and physiology following cholecystectomy have been very nicely and efficiently discussed. Dr. Puestow proposes the thesis that loss of tonus may be responsible for dilatation of the common duct after cholecystectomy. Most of us have believed that "back pressure" has been the chief factor in this change. One of the interesting points that Dr. Puestow mentioned was the probable relationship between intracholedochal pressure and the production of pain. Recently, there has been some noteworthy work done in that line by Bush and McGowan. These men were primarily interested in studying the changing conditions of the common duct following cholecystectomy and choledochostomy. By an ingenious method they were able to represent graphically the approximately 116 mg. of water. It was noteworthy twenty-four hours or more, postoperatively. They found variations in that pressure which amounted to approximately 116 mg. or water. It was noteworthy that the patient's complaint of pain was greatest when the pressure was at its height. In addition to that, they studied and collected valuable data upon the actual effect of certain drugs upon the intraductal pressure and upon the sphincter mechanism at the ampulla. They found that one-sixth grain of morphine caused elevation of pressure within the duct at least twice that of the usual high pressure when the drug was not used. The effect of the morphine was evidently that of causing an initial spasm at the sphincter of Oddi resulting in a rise in pressure and subjective pain. The analgesic effect of the drug later overcame the pain. Other drugs, like allanol and phenobarbital, gave somewhat similar results. Inhalation of amyl nitrite or dissolving 1/150 grain of nitroglycerine under the tongue seemed to decrease the pressure within the ducts and at the same time decrease any subjective signs of pain. I do not know that this is destined to change our attitude toward the use of morphine. We know that morphine will relieve the pain in biliary colic but it was shown by these men that an initial rise in pressure, and an increase in pain preceded the subsequent relief due to the analgesic effect of the drug. This supports Dr. Puestow's contention that increase in intraductal pressure intensifies biliary pain.

The importance in presenting this group of cases is quite obvious. The fact that 92% were relieved and that the surgical procedure was warranted, is significant, but as the essayist has mentioned, the 5% poor results is the point to which our careful attention should

be directed. We must all realize that cholecystectomy will relieve almost without exception the patient with gallstones and a history of colic. But the nervous patient with chronic dyspepsia, and with a questionable cholecystogram is the one that gives us no more than a 50% chance of improvement. The poorly functioning gallbladder by x-ray without stones and without colic is the one that is the bugbear of the surgeon. The poorly functioning gallbladder with colic, to which Dr. Puestow refers, is the one which responds only fairly well to gallbladder surgery.

The manner of handling the acute gallbladder comes up. Looking over the literature, I find that there is no more than one per cent. of acute cholecystitis cases, if allowed to rest, which ever ruptures and causes general peritonitis. It is the consensus of opinion that the organism builds up its resistance to acute infection. Exploration is most effective, when the peak is reached and there is a subsiding of the condition. I am impressed with this paper because it correlates practical experience with some of the newer experimental data in this field. It is most important for us to consider gallbladder surgery in terms of physiology and pathology if we are to hope for improved clinical results.

Dr. C. P. White, Kewanee: I think most of us have had the experience of removing these gallbladders with questionable pathology and clinical symptoms and had complete relief of those symptoms in the patient for a period of one or two years, and then the patient returned with a recurrence of the symptoms. Dr. Puestow says he has left this tube in the common duct for a period of six months, and that relief of the symptoms is due to the paralyzing or at least reflex action upon the sphincter muscle at the duodenal end. I wonder if he has any way of knowing or if there is any reason to believe that there is a final return of spasm in the duodenum that might cause this pain, or how does he account for the return of pain in these patients later on in life.

The RECRUDESCENCE OF MALARIA

Tom Kirkwood, M. D.

LAWRENCEVILLE, ILL.

Malaria has been increasing in the United States since 1932. The increase in Illinois has been proportionate to that in the Southern States. Our state records show that it has caused 574 deaths during the last ten years, the lowest number per year, during this period, being 39 in 1932, and the highest, 71 in 1935. The number recorded for 1935 is the highest since 1921. It causes about half as many deaths each year as typhoid fever.

Malaria has always been a world problem—so serious in many countries that it has been called the scourge of mankind. Its history dates from antiquity. The decadence of the early Grecian civilization has been ascribed to its ravages.[1] It has always been a problem in Italy and during the last year has been the greatest danger to the Italian armies in Ethiopia. In 1923 an epidemic of malaria caused great distress and many deaths in southern Russia. Serious epidemics have recently appeared in the vicinity of the Straits Settlements and in Ceylon. In spite of all the efforts which have been made to eradicate this disease in the Panama Canal Zone, it is still there and is still a public health problem.[2] Hanson, while making the chairman's address at the National Malaria Committee's Conference on Malaria in 1934, said: "Eradication of malaria is not appreciably closer at hand than it was when the committee was formed (1916), even though the roster of charter members embraced the leaders in tropical medicine in the first quarter of the Twentieth Century. We are not so optimistic of accomplishing eradications as we may have been 10, 15 or 20 years ago. The hope now is to accomplish a fair degree of control."[3]

Until recently the death rate from malaria has been gradually falling in the United States for many years. In fourteen of our southern states it reached an all-time low of 6.8 per 100,000 in 1932.[4] Then quite suddenly it jumped to 11.7 in 1933, and in 1934 reached a higher peak than had been seen in twenty years. According to estimates more than 5,000,000 cases occurred in this group of southern states in 1934, with a probable cost of one-half billion dollars.[5]

In many of our northern states, where the disease was once prevalent, it has almost disappeared, and there is a tendency for physicians and others to think that it is no longer a menace and that we can dismiss it from our minds. This attitude is common in some parts of Illinois, but investigation shows that there is little reason for feeling this way about it. The average number of deaths per year for the last ten years is 57.4. There were 62 deaths in 1933, 60 in 1934, and 71 in 1935. During the five year period ending in 1930, malaria caused 281 deaths in this state, and 293 during the last five years. Deaths were reported from 20 counties in 1932, 24 in 1934, and 32 in 1935. Since 1930 deaths have been reported from such northern and central Illinois cities as Chicago, Rockford, Evanston, LaSalle, Aurora, Kewanee, Moline, Danville,

Read before the Section on Medicine of the Illinois State Medical Society, Springfield, Illinois, May 20, 1936.

Peoria, Quincy, Springfield, and Decatur. Thirteen of the counties reporting deaths in 1935 were as far, or farther, north than Sangamon, and 26 deaths, out of the states total of 71, were reported from these counties, 11 being from Cook. In 1934 only six counties from this section reported deaths from malaria. Infection in transients and narcotic addicts may account for some of these deaths in the northern part of the state. However, the fact that this number of deaths occurs in this region shows that carriers are there and that local epidemics may be expected anywhere. Shaughnessy has shown that the use of malaria in the treatment of paresis may become a public health hazard.[6]

The morbidity rates for the various states are notoriously unreliable as malaria is seldom reported.[7] In 1931, 561 cases were reported in Illinois—the largest number for any one year since 1926. Sixty-one deaths occurred in this state that year. It is believed that we have about 300 cases for each recorded death.[8] At this rate we had about 18,000 cases per year in 1931, 1933 and 1934, and with 71 deaths in 1935, we probably had a minimum of 21,300 cases last year. In many parts of the South the falciparum parasite is considered responsible for most of the deaths.[9] This may be true in southern Illinois. However, the tertian parasite is responsible for most of our infections in this state and, while it causes some deaths, the rate from this parasite is low in comparison to falciparum infections. Since the tertian parasite with its low rate predominates in this state, it is possible that we may have over 400 cases to each death. Any disease which causes from 18,000 to 28,000 cases of illness per year in one state deserves serious consideration.

The Anopheles quadrimaculatus mosquito is the chief vector of malaria in this part of the world. It is found throughout Illinois and as far north as central Minnesota, so all of this region is potentially malarious. Other anopheline vectors are also found in this region and in Canada. In Europe and Asia some of the regions in which malaria is most highly endemic are considerably north of the summer isotherm of 70° F. In this country this corresponds to the territory around Lake Superior. The death rate from malaria in Illinois in the middle of the 19th century was enormous.[10] It caused 1,146 deaths in 1860 with a rate of 66.9. In 1880, 1,114 deaths were reported, the rate being 36.1. This is about the present rate in Arkansas, so it is obvious that we still have a very heavily infected area quite close to us. In 1900 the number of deaths dropped to 497, which made the rate 10.3. This is the present rate in our southern 12 counties. From 1917 to date it has ranged from 1.70 (in 1917) to an all-time low of 0.50 in 1932. Our all-time low in Illinois appeared in 1932 as it did in the southern states. The mortality rate for this disease follows rather definite cycles, high peaks appearing about every ten years with minor elevations appearing between these high peaks. The last great epidemic in Illinois occurred in 1872.

The mortality rate in Illinois during the last five years has ranged from 0.5 in 1932 to 0.89 in 1935. The rate in the north half of the state has been low for many years, and as most of the population is concentrated in that part of the state, this makes the state rate look very favorable. Large cities have little malaria. The rate for Illinois, excluding Chicago, is 1.36 for 1935. Adding Chicago's population reduces this to 0.89 despite the fact that malaria caused 11 deaths in that city last year. The picture in the southern part of the state is quite different. In 1934 Alexander County had a rate of 31.0; Johnson, 29.0; Union, 20.0; Massac, 7.0. In 1935 the rates were as follows: Alexander, 13.30; Johnson, 29.40; Union, 5.02; and Massac, 42.17. Twelve counties in this malaria belt had an average rate of 10.3 in 1935. The same group had about the same rate for the years 1922, 1923 and 1924. The rate for the lower 28 counties in 1935 was 5.5. The northern boundary of this group of counties crosses the State from east to west, just south of Alton. The 1935 rate (10.3) for the lower 12 counties is higher than the 1933 state rates in Virginia (0.4), North Carolina (1.2), Kentucky (2.9), Oklahoma (4.7), Missouri (5.5), Texas (6.2), Alabama (9.8), and Tennessee (10.1), and is exceeded only by Georgia (12.3), South Carolina (13.2); Louisiana (20.2), Florida (24.0), Mississippi (35.5), and Arkansas (48.8). The 1933 rates quoted for these states are much higher than usual because of the sudden increase from the 1932 all-time low.[11] The 1932 average for these states was 6.8, which is not much higher than the 1935 (5.5) for our southern 28 Illinois counties, and the 1933 rate of 11.7

for these states is not much above the 1935 rate (10.3) of our southern 12 counties. The Massac County rate of 42.17 and Gallatin's rate of 39.36 for 1935 puts these counties up with the worst of them.

The fact that a county has no malarial deaths does not mean that its case rate is low. Prior to 1935 we have had no deaths in Lawrence County for several years, but we have had many cases of malaria. The school records in Lawrenceville show that about 100 students were absent because of malaria in 1934, while none were absent because of typhoid.

The sudden increase in malaria in our southern states which started in 1932 and 1933 has been accompanied by similar increases in malarious foci in the north and by the reappearance of the disease in many places from which it has long been absent. A small epidemic appeared in Paw Paw, Michigan, in 1934.[12] A few residents in this town were carriers, having been infected in Central America. The pickers in the neighboring Michigan fruit belt come from all parts of the country, and some have malaria. A survey by the health authorities turned up 18 active cases of malaria, 48 breeding places for mosquitoes, and *Anopheles quadrimaculatus* mosquitoes. Another epidemic was reported from Aurora, Ohio, thirty miles southeast of Cleveland, in 1934.[13] Thirty-seven cases were discovered in this town of 1,000 inhabitants. The disease in this instance was probably introduced into the town by a citizen of Florida who was ill there in May. In 1933 an epidemic was reported from Peoria, Illinois, during which 26 patients were admitted to one hospital. Five of these patients died. Twenty-six cases of malaria were admitted to the same hospital in 1930, and 13 in 1931, so there must be a number of carriers in the vicinity of Peoria.[14] Richardson,[15] while discussing the Peoria epidemic, calls attention to other epidemics, within recent years, in Springfield and Decatur and says that the Decatur people decided that the epidemic there was imported by automobile. He says further, "The Peoria outbreak would not be exactly unique in Central Illinois. We have them every once in a while." Epidemics caused by the common use of a hypodermic syringe by narcotic addicts have been reported from Egypt, and in this country from Chicago, New York, New Orleans, Omaha and the Leavenworth Penitentiary. In New York City 41 such cases of malaria were treated from Sept. 29, 1933, to Jan. 30, 1934. Sixteen of these patients died. One death was due to infection by the quartan parasite. The rest were caused by falciparum infections.[16]

Before considering the possible causes of the recent increase in malaria in Illinois, it may be wise to briefly consider the history of the disease in this part of the country and to examine the causes for its long decline. This is logical since a reversal of the economic and other factors which caused it to diminish may very easily permit it to come back again. The pioneers in Southern Illinois came from the South and were heavily infected when they entered this territory. Conditions here were ideal for perpetuating the disease. The pioneers in the northern part of the State brought some infection with them but it was mild in comparison to that farther south. In all parts of the state the settlers depended on the waterways for power and transportation. They built their trading posts, mills and forts along the streams. Newcomers swapped diseases with the permanent residents. Farmers, trappers and traders from miles about frequented these posts to barter and to visit and contributed to the general pool of infection. Later shifts in the population caused by canals, railroads, wars and westward migration caused epidemics. Mosquitoes were everywhere, the people were poor and improperly nourished, clothing was insufficient, houses were poorly constructed, quinine was expensive, and the population was still on the move. The Civil War exposed thousands of northern troops to infection in the South, and it was a number of years before there was a marked decrease in the death rate.[17]

Europe was rapidly becoming industrialized. Europeans neglected agriculture, buying the needed farm products from us. The demand was enormous. As a result our forests were cleared, our low lands ditched, the great central prairies of the state drained and farms appeared in their places. The newly built railroads carried our farm products to eastern ports. Money rolled in as a result of these activities. The population became fixed. Better houses were built. There was money for better food and clothing and for quinine. Farm animals were introduced, making it possible for mosquitoes to get blood meals

without having to depend entirely on man. Citizens of each locality developed some immunity to its particular malarial parasites, as soon as population shifts stopped. The harder northern winters gave the people more of a chance to overcome the infection.[18]

The consensus of opinion among students of malaria is that those changes, consequent to the destruction of mosquito breeding places while developing farms, and the subsequent improvement in the economic status resulting from the sale of products of these farms, had more to do with the decrease in malaria mortality and morbidity than anything else. The economic improvement made it difficult for malaria to flourish, and it gradually declined. The death rate from tuberculosis has shown a similar trend. In many parts of the North malaria has disappeared without any particular effort on the part of the inhabitants, and in a large part of the country no direct effort at malaria control is being made today. This is one of the causes for uneasiness.

Malara has always been a rural problem and the depression, with its poverty, has had much to do with its recrudescence. Economic conditions have changed. The farm income has dropped from 12 billion in 1929 to 5½ billion in 1932. It is now around 8 billion. The demand for our agricultural products has declined, due to loss of European buying power and to competition with Canada, Australia and South America. The destruction of our forests and the drainage of our swamps, lakes and prairies, allows flood waters to enter our rivers too rapidly, causing costly floods, which damage farms, drown livestock and impoverish the farmers in the valleys. Mosquito breeding places are multiplying. Low land, when no longer profitable, is abandoned and returns to a semi-wild state. Millions of acres are going out of production and will not be used again for years, as this present economic upset in our farming communities is no temporary affair. Illinois has many river valleys where these conditions prevail.

While many farms have gone out of cultivation almost every available house in the country is now occupied by some family (often undernourished) which has returned to the land while attempting to weather the depression. Most of these houses are in poor condition. Many city people have purchased small tracts of land along our improved roads, upon which homes have been built, thus increasing the rural population. Paved roads and automobiles have the population on the move. Laborers can now follow the crops from south to north. A cotton picking machine has been invented which will release 75% of the labor where it is used. Laboring people in the cotton country live in some of the most heavily infected regions in the South and many will be carriers wherever they go. Inhabitants in our malarious regions in such times as these are undernourished and are financially unable to buy needed medicine and to properly screen their houses.

Dams are being built in our rivers for purposes of flood control or for furnishing power. Unless properly cared for such artificial lakes always cause an increase in malaria. The shores of many lakes are lined with cottages within easy flying range of anopheles mosquitoes. Dance halls, amusement parks, swimming pools, wayside eating places and tourist camps are often located near streams or lakes. Athletic contests such as soft ball games are often played late in the evenings under flood lights, attracting crowds of spectators and exposing many to attacks by mosquitoes.

The disease now as always follows the rivers, and Illinois is bordered by large rivers to a great extent, and is penetrated by large tributary river systems, in all of which flood control is a problem. On the map one notes that the heavily infected countries are on the Wabash, Ohio, Mississippi, Kaskaskia, Illinois and other rivers. The counties on the water sheds show the lowest rates and those along the rivers the highest. Since 1905 the Eastern Illinois oil field has furnished an automatic oiling system for the Embarrass and Wabash rivers. The waste oil usually kept a good film on these streams and the creeks which flowed into them. After floods the receding waters left an oil supply on pools which discouraged mosquito breeding and killed vegetation along the banks. Four years ago the oil companies were ordered to destroy all waste oil to prevent stream pollution. Our streams are now clean but we have more mosquitoes. We have all noticed a great increase in malaria and one of our older physicians tells me that he has

seen more cases in the last four years than he saw in the two preceding decades.

Since 1922 mosquito abatement projects have been started around Chicago and its suburbs, and in several southern Illinois towns under the direction of the State Department of Public Health. Where malaria is present these projects have materially reduced its incidence, and the mortality rate would undoubtedly be higher if this work had not been done. It is not difficult to control mosquito breeding in the vicinity of cities. All territory within a mile of the city limits should be included in the project. Such work can be done at a cost of $500.00 to $1000.00 per square mile.[19] With WPA labor available in all communities, this work should be done without any additional cost whatever. Methods of control which are feasible for the concentrated populations of towns and cities are, in ordinary times, economically impossible in rural communities, where proper screening is the easiest, cheapest, and most reliable of all control methods. However, any other practical methods of control which can be used, should be added to the screening program. Intensive state-wide treatment is now being tried in two southern states, using atabrine and plasmochin.[20] The results are not yet available. In a recent survey made in Arkansas to determine the incidence in school children, the blood film malaria index varied from 1.53 to 17.47 per hundred, the average rate for the counties examined being 8.15. In the Arkansas penal institutions 5.9% of the inmates were found to be infected. Treatment of these prisoners with atabrine and plasmochin was very effective, the relapse rate being very low.[21]

The carrier deserves special attention. If he can be eliminated malaria can be eradicated. But the carrier is often hard to find for he may look like the healthiest citizen in the community. Usually, but not always, he will tell you that he has had "chills" at some time during the preceding two or three years. In December, 1930, while treating a baby for melena neonatorum, I gave it 30 c.c. of its father's blood. The father appeared to be in excellent health and had not been ill for years. The child's bleeding stopped immediately but in about eighteen days it had quartan malaria. The father proved to be the source of this infection. I have seen the same thing follow a transfusion in which the donor was apparently healthy. Many of these carriers have established an equilibrium with their parasites and suffer no visible ill effects from the infection. Those who have been unable to do this are often undernourished, anemic, tire easily, have vague neuralgic pains and may have chills after being exposed to cold, when very tired, or after operations. In a country where malaria is rare these patients are often treated for other diseases. On the other hand, in malarious districts all kinds of "chills" are likely to be called malaria. As an example, I saw a boy in 1931 who had been treated for malaria for 14 weeks because he was having chills every few days. He had rat-bite fever. The chills seen with an obstruction of the common bile duct are also very confusing.

CONCLUSIONS

1. Foci of malaria are present in all parts of Illinois.

2. The disease is increasing and the present combination of circumstances affords an excellent chance for it to spread from its old strongholds into new territory.

3. The possibility of malaria must be considered in all "obscure fevers".

4. It causes only half as many deaths as typhoid, but probably is responsible for twenty-five times as many cases.

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DISCUSSION

Dr. Leroy H. Sloan, Chicago: In his very excellent paper Dr. Kirkwood has called attention to an old problem in medicine. In spite of a vast amount of clinical efforts and the expenditure of enormous amounts of money, malaria still remains a medical problem. In the southern part of Illinois and the region roundabout it is, I believe, largely a problem of prevention and active treatment, while for us in Chicago the problem is more one of diagnosis. We in the northern part of the state forget malaria. We are unable to think in terms of malaria. Our students and interns rarely see an active case of malaria infection. However, those interns in our Chicago hospitals who have been born in the south see in every patient with a fever, chill, headache, stomach ache, nausea and vomiting a potential case of malaria while our interns born away from the southern states think largely in terms of endocarditis and sepsis.

You may be interested in some statistical reports from various Chicago hospitals. One hospital has admitted 150,000 patients since its opening. One patient in 6000 had malaria. Another hospital with which I am familiar had 25 patients in 10,000 admissions during the period of four years. Another hospital had reported 15 patients with established malaria in the last five years. However, at the Cook County Hospital there have been a large number of malarial patients in the last two or three years.

Of 80 cases in Chicago in private institutions the source of the infection was distributed all over the world—Belgian Congo, Mexico, Greece, Wisconsin, Arkansas, Alabama, Massachusetts, Louisiana, Michigan, Missouri, southern Illinois, Texas, Florida and the like. Malaria has been associated in these private patients with diabetes, tuberculosis, renal infections and syphilis. One patient is recorded who contracted malaria during transfusion from his father. In the Cook County Hospital the malaria patients in the last two or three years have been in fairly good numbers "line shooters," that is, addicts given to using each other's needles for intravenous injection of the particular narcotic. In our own ward in the last seven months 12 patients have been diagnosed as having malaria with one death; 9 of these patients were line shooters. By preference these addicts were heroin users. It is reported that in our addicts many are mixed infections. We have learned that a white blood count of even 25,000, 20,000 or as in a recent case 15,000 does not rule out the presence of an active malaria. It is very probable that in patients with undetermined fever we might well again use the therapeutic test of quinine or one of the more recent remedies such as atobrin or plasmochin to rule out the presence of malarial infection. It is very probable that we should examine more carefully for enlargement of the spleen and surely in all patients with a leukepenia should give thought to the possibility of malarial infection. We would do well to bear in mind many of the fine points which Dr. Kirkwood brought out in his very excellent paper.

Dr. Kirkwood: (Closing Remarks) Malaria is causing about the same number of deaths as diphtheria and typhoid in the 28 southern Illinois counties, although only responsible for about half as many deaths as the latter disease in the entire state. However, the case rate from malaria is far higher than either of these diseases and each patient is ill from one to several weeks. This is the most serious part of the problem.

I would like to thank Dr. Sloan for his excellent discussion, and to express my appreciation for assistance from Dr. McShane of the State Department of Public Health, and Drs. Dauer and Faust of Tulane University, in assembling data for this paper.

VARIOUS ACTIVITIES OF THE BEATING HEART

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The human heart is a tough customer. Protect children from mild chronic infections and heart disease will lose its high place of morbidity and mortality. In its output of blood there is an average of three to five liters per minute for the resting heart and as much as twenty liters per minute to meet the demands of strenuous exercise. This wide range marks the amount of cardiac reserve. There is in the normal heart a nice adjustment of pressure between the auricles and ventricles; for the auricles not in excess of five m.m. of mercury, and for the ventricles, one hundred twenty to two hundred m.m. of mercury. These amounts of pressure are sufficient to meet the physiological needs of the normal heart.

It is not difficult to imagine what happens to the economy of the heart when the mitral valve is affected by disease. Here is an all sufficient reason to give parents, as to why children should rest in bed when there is elevation of temperature. All physicians know the impor-

Read before the Section on Medicine of the Illinois State Medical Society, Springfield, May 19, 1936.

tance of rest in bed for the child when fever is present. Unfortunately, all parents do not know. The physician is not consulted and the damage is done.

The old adage, "Digitalis and rest, the only treatment for heart disease," held sway for so many, many years that laymen were converted to that belief with diastrous results for the laymen and serious reflection on the intelligence of physicians. The treatment of heart disease, once a restricted endeavor, with the stethoscope as the faulty and chief reliance, now invites the entire field of medicine.

The beating heart is a most interesting laboratory in the realms of physics. In the performance of its duty of supplying blood to itself and to all the tissues of the body, there is offered for contemplation the working of various physical laws.

Some of these laws have been common knowledge for a long time. They were discovered by men who had an absorbing curiosity to learn the reason for things that happen. Those men witnessed certain events in nature that are constant in occurrence—the falling apple, the swinging pendulum and the dancing lid of the steaming tea kettle. In their minds was ever present the question, Why? These and other phenomena of nature open to the inspection of all, but the reasons for their occurrence appealing only to the few, arrested their attention. The discovery of reasons by the few are the milestones of progress along the trail of the centuries. This burden has never been laid down. In every branch of science the same type of pioneers continue to erect milestones of progress.

Some of the physical laws which play so important a part in the ability of the heart to perform its work are simple in character and are readily understood by immature and untrained minds. This is fortunate in that it makes it possible for the physician to illustrate in language that the patient can understand, what the heart does, how its owner can ease its burdens, and keep it worthy of the one-time slogan displayed at the show booth of a well-known popular priced automobile. "Gets you there, gets you back." Other physical laws presented by the beating heart are complicated and require the possession of a knowledge of some one or more of other sciences in order to fully comprehend their significance.

The contractions of the normal heart are rhythmic in character. With the opening of the mitral and tricuspid valves, the laws of gravity come into play and have their part in the filling of the ventricles. The contracting auricles increase the pressure within their chambers and give sufficient momentum to carry the blood to the ventricles in ample time to maintain the physiological rhythm necessary to the proper distribution of the blood. The rising volume of blood in the ventricles invites the function of another physical law and the valve leaflets are floated to the position where they act as barriers to prevent the return to the auricles of the ventricular contents. With the increased pressure resulting from the contracting ventricles, the thin and delicate valve leaflets would, like sails before the wind, be bellied into the auricular cavities and their purpose as barriers to the return of the blood from the ventricles be defeated. To prevent this, the chordae tendinae and the papillary muscles, the guy ropes of the heart, now come into action and the laws of stress and strain assume a role of major importance.

Peripheral changes in the circulation bring into activity laws having to do with hydraulics, those laws of hydraulics relating to the passage of fluids through conduits.

The fundamentals of the foregoing laws are quite generally understood. Perhaps a common knowledge of these simple laws makes them appear to the physician unworthy of serious consideration. It might seem a childish waste of time for the physician to devote study of their application to the treatment of the damaged heart. On the contrary, knowledge of the foregoing laws is worthy of serious consideration, and study of their application is time well and profitably spent in the successful treatment of heart disease.

Frequently, patients present themselves with symptoms in keeping with damaged hearts. Careful examination reveals heart anatomically sound. These hearts are temporarily suffering from the effects of pathological conditions in one or more areas of the body other than the heart. Osler said, to know syphilis is to know medicine. Of even greater importance, it seems to me, is to know the heart if you would know medicine. but know something of all there is to know of medicine if you would know the heart. In Osler's day syphilis went unrecognized. In our

day syphilis goes unrecognized. Ricord was ridiculed and accused of seeing syphilis everywhere. Belfield maintained that everybody had syphilis. In obscure cases all physicians suspect syphilis. Their suspicions are banished by negative laboratory findings. This is unfortunate.

The two most important parts of a heart examination are the story told by the patient and the physical examination made without the aid of any instrument or machine. One of the most deplorable and misleading statements in case reports is "Past history essentially negative," or in describing the physical examiantion, "Head and neck essentially negative." It is a fine out for either a slovenly made examiantion or it might be interpreted as an intent to deceive.

Mechanical aids are of some value to those who have eyes but see not and powers of observation that function indifferently. Mechanical aids are often of decided value to those who know how to take histories, who know the appearance and feel of the normal and who understand the effect or lack of effect of factors near or remote. For permanent records, mechanical aids are invaluable to the progress of clinical medicine.

The first instrument of precision intended for the purpose of direct study of the heart is the stethoscope, invented by Laennec in 1819, and based upon the laws of sound conduction. Since that time the stethoscope has occupied a most prominent place as a diagnostic aid. It has a definite value as a means of discovering valvular disease, but is not of much use as an aid in interpreting muscle status or as a guide to treatment.

McKenzie rewrote the History of Heart Disease and by means of the polygraph made visual records of circulatory events. Einthoven invented the electrocardiograph, which replaced the polygraph. The Roentgen ray made possible accurate knowledge as to the location, size and continuity of the heart; accurate knowledge as to aneurisms and other tumors that affect the heart. None of these important facts can be demonstrated satisfactorily by means of palpation, percussion or ascultation.

Within recent years attention has been given to a subject long neglected—that is, study of the peripheral circulation. The plethysmograph gives us visual evidence of the status of the peripheral circulation, enhances our interest in the study of this condition and the effect of peripheral changes on the integrity of the heart.

The physiologists have made studies correlating different heart activities and charted their findings. This chart, taken from Pardee's book on "Clinical Aspects of the Electrocardiogram," is interesting because it vividly portrays what every doctor knows, in many instances but vaguely. It portrays things to which few doctors have given careful study, the relation of various activities of the beating heart to one another.

In this chart is recorded time relations of auricular contraction and pressure within the auricles and ventricles, and the remoteness of the first heart sound to auricular contraction. In the contraction of the ventricles we see the closer relation of contraction, pressure and first sound.

We will first establish the geography of the various lines. The vertical lines are constant in direction, fifteen in number, and equally spaced.

We will now consider the geography of the various lines traversing the field.

The tracing marked "E" begins to rise at vertical line No. 1, describes a gentle curve and returns to the original level. Again it rises to a sharp peak, then descends to a point below the original level, rises for a short distance, when it is extended to the right, first with a slight downward curve, then curving upward and finally returning to the original level from which it started.

The second tracing, "S," maintains the same level until it has passed vertical line No. 5. Then it travels up and down in a series of quick deflections until it approaches line No. 8, when the movement becomes slower. Crossing line No. 9 there is a return to the original level, until it approaches line No. 14, when another series of up-and-down deflections are inscribed.

The third tracing marked "A" proceeds at the original level until it reaches line No. 2, where it describes an upward curve, returning to the original level at vertical line No. 5. It then rises and describes a smaller arch with a shorter base, proceeding on the original level until vertical line No. 14 is reached, when it makes a shorter drop.

The fourth tracing marked "V" makes a somewhat undulatory progress until it reaches vertical line No. 5, when it makes a sharp and sudden rise, which terminates in a graceful curve, the

highest point of which is at vertical line No. 10. It then begins the descent, reaching the original level at vertical line No. 15.

We will now establish the identity of the various lines. The vertical lines are divisions of time, each space representing 0.04 second. There are fourteen spaces, totaling 0.56 second, the average time of the heart cycle.

Tracing "E" is taken from Lead II of an electrocardiogram.

Tracing "S" is a phonocardiogram showing the relation of the first and second heart sounds.

Tracing "A" represents the pressure within the right auricle.

Tracing "V" represents the pressure within the left ventricle.

The contraction of the auricles begins at vertical line No. 1, reaches its peak 0.04 second later, returns to the original level about 0.10 second after its origin. It then proceeds to line No. 4, which marks the end of auricular contraction and is known as the PR interval.

The line marked "A" represents pressure within the right auricle. You will observe that it does not begin to rise until at least 0.06 of a second after the beginning of auricular contraction. It reaches its peak at the time the P wave has returned to the original level.

The explanation of the difference of muscular activity and rise of pressure is that the excitation of the auricular mass is not instantaneous but begins in a few fibres and gradually spreads throughout both auricles. The return of P wave to the original level is not evidence of the completion of auricular contraction as proved by the line representing auricular pressure. Some fibres have relaxed and some are still contracting. At vertical line No. 4, representing an elapsed time of 0.12 of a second from the beginning of the contraction of the auricles, we have the beginning of ventricular contraction. In this electrocardiogram Q is not inscribed. R is inscribed and S is inscribed. Then follows a slight dip preceding the inscription of T. You will note that the ventricular contraction began at the fourth vertical line while the ventricular pressure did not begin until 0.16 of a second of time had elapsed, the fifth vertical line measuring that divison of time. The ventricular pressure rises abruptly and reaches its highest point at the tenth vertical line or 0.36 of a second after the beginning of the contraction of the auricles. It then begins its descent at the time the peak of the T wave is inscribed. The relaxing of pressure is coincident with the final contractural spurt of the ventricles represented by the T wave.

We will now note the relation of the heart sounds to muscle contraction and pressure. The first upward deflection of the phonocardiogram, representing the beginning of the first sound, takes place 0.06 of a second after the beginning of the contraction of the ventricles and 0.18 of a second after the beginning contraction of the auricles. It reaches its maximum height 0.11 of a second after the beginning of ventricular contraction. The first sound is completed 0.20 of a second after the beginning of ventricular contraction. We now have a silent period during the time that ventricular pressure is reaching its highest point and at the point where the relaxation of pressure is nearly completed. Just before this level reaches the fourteenth line, or 0.50 of a second after the beginning of auricular contraction, the second heart sound is inscribed, and is completed at the time when ventricular pressure has entirely disappeared.

SUMMARY

1. All children having from half to one degree of fever should remain in bed until fever subsides.

2. If children develop an endocarditis a minimum of four months is not too long for rest in bed.

3. There are many patients suffering from Symptoms of heart disease in whose treatment digitalis has no place.

4. Because of its spectacular value when indicated digitalis as a remedy for heart disease has been greatly abused.

5. Thinking of the heart as a pump is not sufficient for detailed study and proper treatment.

6. Peripheral changes deserve a great deal more of the physician's attention.

7. The chief use of laboratories is to teach physicians what they may expect from clinical findings and to preserve visual records.

8. All patients in whom heart disease is suspected should have a fluoroscopic study of chest, pictures, and an electrocardiogram. If the patients cannot afford these laboratory measures,

it does not mean that fairly successful treatment is impossible.

9. All physicians should learn to read x-ray pictures and electrocardiograms. It is not sufficient to depend upon the judgment of the relatively few physicians who are expert in these two lines of endeavor.

DISCUSSION

Dr. Warren Pearce, Quincy: Dr. Keating has called our attention to some of the mechanical features of the beating heart which it is well to consider occasionally. A knowledge of these mechanical features is helpful in considering the abnormal activities of the heart.

In this presentation the picture of the study of heart disease has been present in its proper perspective. The history obtained from the patient is of greatest value. Next in importance is the physical examination, and of secondary importance is the use of such mechanical aids as the electrocardiograph. The importance of the electrocardiograph is fully realized even though it is placed third among features of importance in the study of heart disease. In a study of the diseased heart the information we most desire is the reserve capacity of the heart and the patient's story, along with response to exercise at the time of examination, tells us more about the cardiac reserve than any feature of the examination.

Dr. Keating referred briefly to digitalis. All of us, I am sure, have seen patients who had received digitalis for weeks or months, with no particular attention to dosage, often without any medical supervision. We should all constantly keep in mind the fact that digitalis is a drug with definite indications and that when indicated it should be used until the digitalis effect is obtained and that then the drug should be stopped with the exception of a maintenance dose. Its use, prophylactically, in surgery is not warranted. Dr. Paul White has outlined the indications for the use of digitalis as follows: 1. Congestive heart failure; 2. certain cases of auricular fibrillation and flutter; 3. as a therapeutic test in cases of suspected congestive heart failure.

Dr. Keating's paper, especially that portion relating to the mechanical features of the beating heart, is unusual, taking us away from the usual beaten path and, to me, has proven quite interesting.

Dr. Keating (closing remarks): I chose to talk about these mechanical factors, not because you are not all familiar with them, but because I wanted to bring to your attention the ease with which you can tell your patients and give them reasons for what you want them to do in the matter of rest. Rest does not mean just staying in bed. It means a great deal more than that. It means rest of the body and it means rest of the mind. It means the education of the patient mentally and physically.

People who are undergoing mental troubles often develop coronary occlusion, just as it has been noted that people who have had great financial losses in the past have developed carcinomas—General Grant and Camp, the great shipbuilder of 40 years ago, who suffered financial losses.

I want to say that if you will just think these things over you can get your patients converted to your belief, and if you do not do some of these things you will be disappointed in your results and your patients will not go on.

Because of its spectacular results in those cases in which it is indicated, I do not think there are enough doctors who appreciate the amount of trouble they bring upon their patients and themselves by giving digitalis. Long ago the medical profession decided digitalis was good for everything that was the matter with the heart, especially in the treatment of pneumonia. There are a large number of doctors who would not think of treating a pneumonia patient without the use of digitalis. They would think they were indulging in malpractice, when, as a matter of fact, there are many pneumonia patients who will get along much better without digitalis.

In the picture of pneumonia, when your patient is suffering from lack of compensation in the heart, you will find more value in caffein than you will in digitalis. In fact, you will find very exceptional value in caffein, while in digitalis you will not find very much.

THE COMPARATIVE VALUE OF VARIOUS METHODS IN THE ROENTGENOLOGIC EXAMINATION OF THE COLON

CESARE GIANTURCO, M. D., M. S.
URBANA, ILLINOIS

The roentgenologic diagnosis of colonic diseases offers a number of technical problems. The purpose of this paper is to study the various methods of examination and to attempt to establish the comparative value of each.

Before the advent of contrast media, air was injected into the colon for the purpose of radiological diagnosis. But when Cannon and Riedel introduced the use of opaque substances in the form of salts of bismuth or barium the use of air was rapidly abandoned.

For years the colon was examined by following the opaque meal through the gastrointestinal tract: with this technique many observations were required and the opaque medium often reached the colon in a condition of dehydration that made it impossible to obtain a good moulding of the intestinal walls. Furthermore, there was danger that the hardened contrast medium would transform an incomplete colonic obstruction into a complete one. These objections were

Read before Section on Radiology of Illinois State Medical Society, Springfield, May 20, 1936.

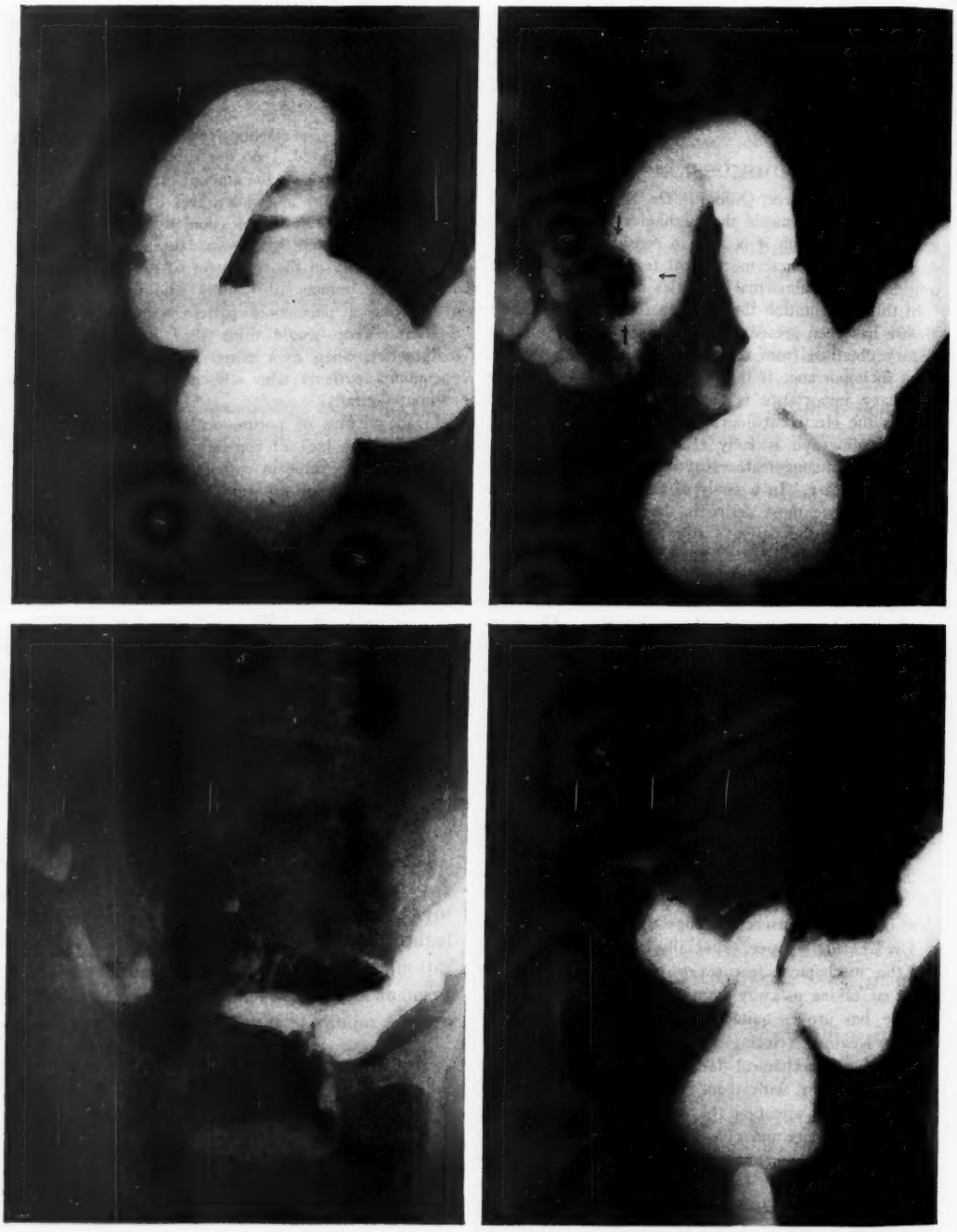

Fig. 1. Polypoid mass in lower sigmoid. A. (Upper left) Barium enema; roentgenogram taken with ordinary technique. B. (Upper right) Overexposed roentgenogram. C. (Lower right) Double contrast method. D. (Lower right) Semi-transparent medium.

eliminated by the use of the opaque enema. This method is generally employed today.

In spite of its many advantages not even the opaque enema satisfies all diagnostic requirements. In 1923 Fisher pointed out that by using the opaque enema one could easily miss those small, pedunculated polypoid lesions which do not deform the contours of the intestine. He suggested that these lesions could be demonstrated by insufflating the colon with air after evacuation of the contrast enema (double contrast technique). In the meantime Forssell, Berg and Knothe were able to show that much could be learned from the study of the mucosal design which appears after complete evacuation of the opaque enema. In 1928 Bluhbaum, Frick and Kalkbrenner emphasized the advantages of using thorium salts instead of barium sulphate as contrast media in the opaque enema because thorium has a much higher atomic weight (232.2) than barium (137.36). They also succeeded in developing a thorium compound which coagulates in contact with the colonic mucosa for the purpose of producing an even coating for the double contrast examination.

In 1933 Garcia-Calderon and Ledoux-Lebard published some very interesting roentgenograms obtained by the use of a diluted barium enema, that is, of a medium opaque enough to give a good image of the contours of the viscus but also transparent enough to demonstrate polypoid lesions projecting into the intestinal lumen.

To Riegler, finally, must be given credit for the over-exposure technique by which the opacity of the ordinary barium suspension is penetrated by rays of suitable voltage. This technique, although used by Riegler for the demonstration of polypoid lesions in the stomach, is most useful in the radiological study of the colon.

The existence of such a variety of technical procedures is not surprising if one considers the difficulties of the radiological diagnosis of some colonic lesions. In order to choose from the various methods the ones most suited to the particular cases, we must examine in detail each one of them.

The opaque enema, carefully followed fluoroscopically as it fills the colon, is justly considered the basic procedure of examination. It is generally agreed that before injecting any contrast medium at all, the colon should be thoroughly cleansed of any fecal material. In order to accomplish this various methods may be employed. The patients should eat neither dinner the night before the examination nor breakfast in the morning. Castor oil (2 ounces) taken the night preceding the examination and followed in the morning by soap suds enemas gives a very satisfactory preparation. Saline purgatives are not to be recommended because they act by attracting water in the colon instead of stimulating its peristaltic activity. As a result, the intestine will still contain much fluid when barium is injected and this fluid will unduly decrease the opacity of the contrast medium. Enemas not preceded by castor oil should be employed only in debilitated patients, as they succeed in cleaning only the most distal parts of the colon.

As a good preparation is absolutely essential for a good examination, I may be forgiven for quoting details. In giving the cleansing enemas it is very common to inject into the bowel the air contained in the rubber tube. This can be avoided by letting some fluid escape before inserting the tip into the rectum. In spite of all precautions gas may reach the colon from the upper intestinal tract. As the presence of gas is quite disturbing it is advisable to ascertain the preparation of the patient with a preliminary picture of the abdomen. If this picture shows an abnormal amount of gas one may inject 1 cc. of pitressin. This drug seems to be quite effective and when injected intramuscularly it acts in 20-30 minutes by increasing the tone of the colon and so freeing it of gaseous collections. Pitressin also increases the blood pressure and should not be used in patients with hypertension: in these patients one must try to clean the colon of gas by means of additional enemas.

The preliminary picture of the abdomen is most useful not only to inform us about the preparation of the patient but also to disclose any abnormalities of other abdominal organs visible without the use of contrast media. It is only when the colon is sufficiently clean that one should proceed to the fluoroscopic examination by means of the opaque enema.

In preparing the opaque medium to be used for the injection one may employ barium salts suspended in water or the more costly thorium compounds. Barium is more generally used, is not expensive and can be considered a satisfactory medium if the suspension is prepared so that the salt will not deposit too early. Thorium

has the advantage of a greater opacity, and of a perfect stability; however, an opacity greater than that necessary for a good fluoroscopic examination is hardly desirable, and the stability of well prepared barium suspensions is sufficient for all practical purposes.

Before inserting the cannula, the air contained within the tube is allowed to escape. As the patient will be requested later to turn from side to side it is essential that the examiner use a tip which will not be easily expelled from the rectum. A tip which has a large end and a narrow neck will be easily retained by the sphincter. As the patients are usually apprehensive about the examination and their cooperation is essential, they should be told that the procedure is a short one and that since the examiner can see what he is doing any overdistension of the bowel will be avoided. They should also be requested to notify the examiner of any discomfort and to breathe easily and rather deeply during the whole examination, avoiding any effort to "bear down." It is essential that the contrast medium be injected at body temperature.

The fluoroscopic examination should begin with the patient between a supine and a left-sided position so as to expose better the distal loops of the sigmoid. By turning the patient on his back and then on his right side one will be able to dissociate these extremely coiled loops. While the patient is on the right side one can dissociate the two branches of the splenic flexure. The patient is then asked to turn on his back and the transverse colon is examined; then on the left side again to dissociate the two branches of the hepatic flexure. The cecum is usually well examined with the patient on his back but when it descends deep into the pelvis it may be necessary to turn the patient on one side or the other. The observer should make sure of the identity of the cecum by trying to see the appendix or the terminal ileum by reflux. Many mistakes have been made by not observing this rule, as a stenosing tumor of the cecum or a patch of colitis would not be detected. In the case that neither appendix nor terminal ileum can be visualized, barium should be given later by mouth and followed to the cecum. During the whole examination the observer should follow the head of the opaque column, as this often splits around a polypoid tumor and should use his hand to flatten every accessible part of the colon in an effort to detect alterations of the mucosal lining.

A careful fluoroscopic examination should never be omitted, as it is the most important part of the radiological investigation; however, one must understand its many limitations. The image is rather indistinct, the time is necessarily short, the length of the organ is considerable, its coiled loops necessitate frequent changes in the position of the patient. It may be said that the lesions detectable by the average examiner on fluoroscopic examination are those that deform the contours of the bowel in a considerable manner, such as rather extensive chronic ulcerative colitis, tumors larger than 2 cm., marked amebic or tuberculous involvement of the intestinal walls. Finer and smaller lesions which do not induce marked deformity of the wall of the bowel (initial colitis, small carcinoma, small polypoid lesions) especially when situated in the coiled loops of the sigmoid, will often escape the most painstaking fluoroscopic examination.

At the end of the fluoroscopic examination it is the custom of many radiologists to take a picture of the whole colon with the patient lying on his abdomen. In order to dissociate the loops of the lower sigmoid it is often necessary to take another roentgenogram of the patient between a supine and a left-sided position. The roentgenograms should be taken in apnea with Bucky diaphragm and with an exposure not exceeding two seconds. The pictures obtained will give a better definition to the shadows previously observed in fluoroscopy and will make it possible to study small alterations of contour which are often the early signs of ulcerative colitis. After taking the roentgenograms the patient is allowed to evacuate the bowels.

Forssell, Berg and Knothe have emphasized the importance of studying the colonic mucosa after evacuation of the enema. For this examination roentgenograms are taken when only enough barium remains in the colon to coat the mucosal lining. This ideal condition is, however, seldom obtained over the whole length of the organ because in the majority of the cases enough barium is retained to obscure the mucosa of a considerable part of the intestine. When the barium is not completely expelled one can try to facilitate its evacuation by fluoroscopic manipulation. If this is unsuccessful, roentgeno-

grams taken with compression (so as to flatten the intestinal walls, one against the other) may be employed here as in the duodenal cap, but often such technique becomes impractical because of the length of the viscus and because the distal loops, which are the frequent seat of pathology, are inaccessible to compression since they are situated deep in the pelvis. I believe that it can be said that although a roentgenogram after evacuation of the enema should always be taken, one seldom obtains a cast of the mucosa over the entire length of the colon.

The double contrast technique is an interesting and beautiful procedure which permits the exploration of the depth of the colon. It consists of the injection of air into the colon after the patient has evacuated his opaque enema. By this technique Fischer, in Germany, Weber, in this country, and many others, have been able to demonstrate exceedingly small polypoid lesions of the colon. When all the conditions are perfect, the brilliancy of such films has no equal. However, conditions are seldom perfect: the colon must be evacuated rather thoroughly but not too thoroughly in order to leave a thin film of barium on its walls to be distended by the air. If the evacuation is too complete the film of barium is too thin to give the double contrast effect; if it is not complete enough (and this happens more often) the barium will collect in pools in the most dependent parts of the bowel and these parts will not show any double contrast. Furthermore, if the patient is allowed more than five minutes for the emptying of his bowels, the film of barium will dry in the contracted areas of the intestine and appear chunky and irregular when distended by air. Where the emptying is insufficient an improvement in the image can be obtained by taking the roentgenograms in the upright position so as to allow the barium to collect in small pools instead of large ones; but even so, the amount of intestine without the double contrast effect remains great in the majority of the patients. The difficulties inherent to this technique, as well as the fact that the interpretation of the images obtained is somewhat different from the classical ones, have kept it from becoming of general use.

The examination with semi-transparent media aims at obtaining information about the mucosal lining and small intraluminal lesions without relying on the uncertain evacuation of the colon. Barium in low concentration in water, has been used by Garcia and Calderon, but in my experience this medium deposits too soon after the injection. For this examination Thorium dioxide (Umbrator 20% in water) should be employed because it does not deposit even when used in very low concentrations. The solution is injected under fluoroscopic control and followed to the cecum. Roentgenograms are then taken in a prone position with the usual technique and the patient allowed to evacuate the bowels. While the fluoroscopic image lacks the necessary contrast for a good examination, the roentgenograms will show surprising detail as polypoid lesions or air bubbles as small as 2 mm. become evident. The sensitivity of this method is somewhat dangerous because one may mistake an air bubble or some fecal material for an organic lesion. In those cases in which one is not sure of the significance of abnormal shadows an additional roentgenogram in the upright position may be taken. This will send the light fecal material and air bubbles to the uppermost parts of the colon, heavy fecal material will sink to the bottom and organic lesions will keep their position. Owing to the extreme sensitivity of the method, it is imperative that the colon be cleaned in a thorough manner preceding the examination.

When the patient returns from the toilet the investigation must be completed with a fully opaque barium enema, which will allow a good fluoroscopic examination. After evacuation of this second enema, a roentgenogram may be taken to study the mucosal design according to Berg and Forssell.

The semi-transparent technique, in my experience, has proved very satisfactory for radiographic purposes, but the medium is too thin for a good fluoroscopy; the examination becomes quite expensive because of the cost of the medium; two enemas are necessary, and in the majority of patients the same results can be obtained in a different way.

Most radiologists use an excessive amount of barium in the preparation of the opaque enema. The reason for this is the desire to obtain a good opacity for the fluoroscopic examination. Now if a good fluoroscopic opacity is obtained by a given suspension any addition of barium will not increase this opacity any further because

all the rays will have already been absorbed by the existing opaque material.

This reasoning prompted me to find out what percentage of barium to water could be called opaque when the fluoroscopic examination is conducted by means of rays obtained at 75-90KW and 4 MA. After numerous trials I have found that a proportion of 20% barium in water (by volume) would satisfy all the opacity requirements of the fluoroscopic work.

Barium of such a concentration is quite opaque fluoroscopically, but it becomes more and more transparent as we increase the voltage for radiographic purposes. By taking the roentgenogram at 95-100 KW, 50 MA, 30" distance, Bucky diaphragm, 2 seconds, one can easily see through the loops of the colon and discover small intraluminal lesions in all patients whose abdomens do not exceed 12 inches in thickness. This fact makes it possible to obtain the radiographic advantages of the semi-transparent media by employing a barium suspension of an opacity that allows a satisfactory fluoroscopic examination as well.

At the present time I divide my patients into two classes. The thin patients are examined as follows: barium enemas followed by fluoroscopic examination and by overexposed roentgenograms; a roentgenogram after evacuation is also taken. The heavier patients are examined as described with the semi-transparent medium followed by a fully opaque barium enema for fluoroscopic purposes and for the study of the mucosa after evacuation.

	Number of cases	Number of Satisfactory Examinations	Extent of Visualization in Satisfactory Examinations	Causes of Failure
Fluoroscopic examination with barium enema	20	20	Whole colon	
Radiographic study of the mucosal pattern	20	3	70% of the length of the colon or more	Insufficient or too complete evacuation.
Double contrast (Patient Prone)	20	2	70% of the colon or more	Dehydration of barium film
Double contrast (Patient upright)	20	5	70% of the colon or more	
Semitransparent medium	20	18	Whole colon	Poor preparation
Overexposure technique	20	16	Whole colon	Abdomen too thick to allow penetration of barium by Roentgen rays.

In order to obtain an idea of the comparative value of the various techniques described, I have studied twenty examples of each chosen at random. The fluoroscopic examination by means of a fully opaque barium enema was satisfactory in all cases. The study of the mucosa after evacuation of the enema could be accomplished over 70% of the length of the colon in only three cases. The double contrast method with pictures taken in a prone position visualized over 70% of the length of the colon in only two cases; the same method when the roentgenograms were taken in an upright position visualized over 70% of the colon in five cases. The semi-transparent medium visualized the whole colon in all cases but was unsatisfactory in two patients because of poor preparation. The overexposure technique succeeded in fourteen thin individuals. In the remaining six cases the thickness of the abdomen did not allow the rays to penetrate the barium.

Although it is rather difficult to make definite statements, it seems to me that the methods that rely upon the evacuation of the colon for the demonstration of small lesions are often subject to failure because of incomplete evacuation of the contrast medium. Although these methods should be kept in mind and utilized when possible, I believe that the semi-transparent media and the overexposure technique allow more frequently a complete roentgenographic examination of the colon. The fluoroscopic examination with a fully opaque barium enema should always constitute the basic technical procedure.

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DISCUSSION

Dr. M. J. Hubeny, Chicago: Mr. Chairman and Members: What I have to say really does not concern you so much, because you already know what I intend to say. The only thing I regret is that the Doctor's paper was not presented before a joint session of medicine, surgery and radiology. Some seem to decry the fact that the so-called laboratory methods are methods of precision.

I was interested in the method of approach which the Doctor gave to the subject. He exhausted all the physical means of which we know, was not over-enthused about any, placed them in their proper evaluation. I believe radiology will be put on the horizon more and more by such proper and scientific evaluation of our limitations and possibilities. For some reason there seems to be rather a peculiar attitude toward the roentgenologist, when they think only of the technical or manual process and do not think of the intellectual aspect of his work. As a matter of fact, he renders services like any other branch of medicine, usually divided into two categories.

First, the manual or technical phase; second, the intellectual aspect, which depends on judgment ripened by experience. Frequently the technical work is time consuming as well as exacting, entails considerable expense; this is unavoidable. Therefore, I think a paper of this kind is valuable in impressing the rest of the medical profession of the thoroughness with which our technical work must be done in order to deduce properly.

We had an instance not so long ago of an eminent proctologist who sends his cases to a technician who injects the enema and takes one film. I asked the proctologist if he had done any fluoroscopy in the case. He said he had not. I asked if he had any more films and he said he did not. I asked if he followed the case after evacuation of the enema and he said he did not. It is a concrete citation of men who should know better than to have such an attitude toward a scientific and precise method such as Dr. Gianturco has expounded.

I had access to the manuscript and because of the limitation of time the Doctor was not able to touch upon many of the things he mentioned in the manuscript. I think much importance should be attached to the question of continuous examination after the evacuation of an enema. In the determination of a pathologic appendix or the presence of diverticulae, it is necessary to examine the patient for one or two days after the injection of an opaque enema.

Regarding mucosal patterns, we must be careful, they are so varied even in normal individuals that re-examination might be necessary.

It is the critical areas that we have to watch such as the terminal ileum, cecum, hepatic flexure, pelvic colon and rectum. Also, it is practically impossible to completely clean out the colon, consequently this source of error must be thought of. Another confusion arises in the presence of many sphincters which might simulate spasms or new growths; should this exist re-examination is indicated.

I am pleased to have had the privilege of discussing this paper. We are aware of those things and wish we could make the rest of the medical profession understand there is such a thing as being very thorough. It is quite as necessary to make a diagnosis as it is to be able to perform a good surgical interference. Such painstaking work as the Doctor has given us today will make roentgenology more appreciated.

Dr. H. A. Olin, Chicago: I would like to recite an experience I had in trying to make a diagnosis of malignancy of the colon in an old man of seventy-two. He weighed about 242 pounds and was very uncooperative. I gave him a barium enema and after observing him for about an hour, using very low pressure, I could get the enema fluid to proceed no further than to the distal part of the descending colon. I had him in various positions and still had no success. I took several plates in the incumbent and prone positions and it confirmed the fluoroscopic findings. There was a possibility of obstruction somewhere in the distal descending colon. I did not want to inflate him with air because I thought it would make the obstruction worse and the possibility of subsequent surgery made me exclude the procedure. I then decided to give him a small amount of barium from above, thinking if I could get the barium around the descending colon I would get further evidence. It was impossible to palpate him—his belly was so thick, and I could gain no information that way. He had a very peculiar history which probably may be rather vague. There was no loss in weight but for two years he had vague pains in the lower left quadrant and had some difficulty in having his bowels move the last two weeks because of the increasing pain and the change in bowel habits. He was brought into the hospital for study of possible malignancy and, of course, obstruction. I had him under observation up to thirty-six hours and then had to leave for Springfield. I have not settled in my own mind just what the diagnosis may be because I have not seen the film. Barium at the end of thirty-six hours only reached the splenic flexion. I have been wondering in my own mind because of the mental attitude of the patient and his lack of cooperation if I were dealing with a spasm. I have seen it in a doctor's wife who became very emotional. I was to do a barium enema on her. She was so excitable the fluid did not proceed any further than the sigmoid. The following day, under the administration of atropin she showed a normal colon. I would like to be enlightened as to what procedure I should pursue in the case I mentioned, whether to try this patient under the use of atropin. I certainly am not satisfied with what I have done and would like to receive some information as to what is the method of choice.

Dr. Gianturco: I desire to thank Dr. Hubeny and Dr. Olin for their kind discussion of my paper. I doubt that I can answer Dr. Olin's question in a definite way,

but I believe that the procedure he has adopted in the case he described is the most likely one to give rsults. The arrest of the barium column at the sigmoid flexure is not a rare occurrence, but some deep breaths or waiting a few seconds will usually reestablish the flow. The use of atropine is, in my opinion, quite useful when one wants to differentiate spastic from inflammatory phenomena; this is very important in cases of diverticulitis and in ulcerative processes.

MANAGEMENT OF ARTHRITIS

ROGER T. FARLEY, M. D.

CHICAGO

The incidence of arthritis is so general that the management and control of it are of widespread interest. Since the publication of the research of Dreyer and Reed,[1] I have been interested in the treatment and control of arthritis by means and methods that are somewhat advanced at this time, including the use of antiarthritic agents for the relief and control of arthritis in general.

Hench, Bauer, Fletcher, Christ, Hall and White,[2] and many others have earnestly studied the arthritis problem but are today far apart as to its etiology and therapeusis. It is therefore clear that any measure which will give any real degree of relief to arthritics is greatly to be desired.

The patients referred to in this paper were entirely unselected, being one group appearing in the author's private practice and remaining under treatment sufficiently long to make valid data for a report. Some of this group were treated for the first time, while others had received treatment elsewhere over periods as long as five or six years. The latter group, for the most part, had not been benefited by the former forms of therapy.

Therapeutic Management. The entire group was given high vitamin D therapy.[3] The preparation used is a capsule containing 50,000 or 100,000 U.S.P. (I.U.) units of vitamin D. The initial dosage was usually 200,000 units per day. This dosage was increased in obstinate cases to 300,000-600,000 units per day and in one case to 1,000,000 units per day. The higher dosages were administered only when the patient was in the hospital where close observation was possible. In the usual case a daily dose of 200,000 units or more as indicated was maintained throughout the period of treatment. We were constantly alert, when administering the higher charges, for the appearance of the symptoms of overdosage. These symptoms usually consist of dizziness, nausea, increased micturition and slight diarrhea, and seldom appear on dosages under 400,000 units per day. Upon reducing the charge to 200,000 units per day or less the symptoms promptly disappear and subsequently the dose may be increased without the reappearance of these symptoms. In a few cases where

Fig. 1. Case 5689. Male, 61 years. Knee and hand before treatment. Case 5260 showed deformities similar and worse generally to Case 5689.

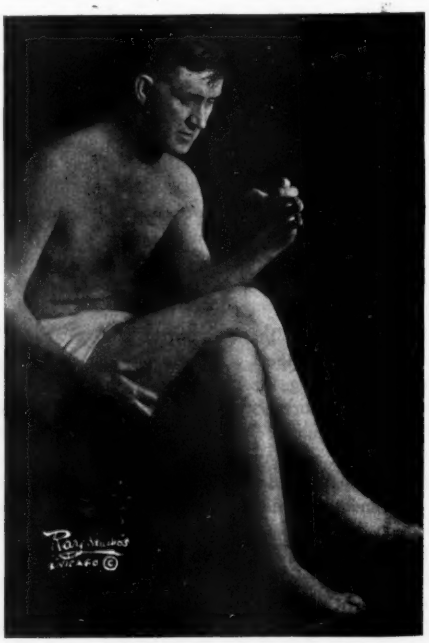

Fig. 2. Case 5260. Male, 41 years. After 5 months treatment showing movement restored to all joints except left wrist. Nutritional restoration general, 47 pounds gain.

dizziness or nausea resulted from the low charge of 200,000 units per day, it could be controlled by the administration of brewer's yeast. This measure is also effective in maintaining a patient on a higher dosage than would have been otherwise possible.

The diets of the patients have been regulated or advised along the lines of natural foods. Dishes containing adequate quantities of uncooked fruits and vegetables selected from those known to be excellent sources of vitamins and minerals, are advised.

In especially severe or stubborn cases, when the economic status of the patient would permit, we have used hyperpyrexia. The particular apparatus used was the high frequency coil type enclosed in a cabinet. The cabinet temperature never rises above 100° F. while the induced temperature of the patient may rise to as much as 108° F., at which level it may be maintained for four to eight hours without greatly fatiguing the patient. Observations show that the heart rate does not follow the temperature as is found in other forms of fever. The heart rate seldom increases above 110 beats per minute. Hyperpyrexia itself has no lasting effect upon the course of arthritis. As an adjunct to the mass charge of vitamin D therapy, it is sometimes desirable.

Chemical analysis of blood, urine and feces does not show the serious condition of the patient under present laboratory methods. However, observations made on this group show a rapid blood sedimentation reaching as high as 37 m.m. in sixty minutes; as improvement takes place the sedimentation becomes slower. Blood calcium and phosphorus remain constant within the normal range. Two cases only of this group were outside the normal range.

Fig. 3. Case 5260. Showing nutritional restoration of shoulder and arm.

A brief description of a few of the 27 cases upon which this report is made, follows:

4984: Female, aged 60 years: This was a pronounced case of atrophic arthritis affecting the hands, elbows, shoulders, wrists and ankles. She was unable to walk into the hospital and experienced much pain. She was given 200,000 units of vitamin D daily and one hyperpyrexia treatment per week. At the end of one month she was entirely pain free and the movement of her joints was improving. She was discharged from the hospital to continue the vitamin D therapy in her home. She has continued to improve sufficiently that we believe normal movements of her joints will result.

5122: Male, aged 67 years: This was an ambulatory case of chronic atrophic arthritis. The main complaint of the patient was pain. He received 200,000 units of vitamin D per day and one hyperpyrexia treatment per week during his stay of six weeks in the hospital.

At the time of his discharge, he was pain free and has remained so.

5310: Female, aged 55 years: This was a severe case of acute atrophic arthritis. Pain and stiffness was found in practically all of her joints, including the jaw. Her blood pressure was 208/134. She was given 200,000 units of vitamin D daily and one hyperpyrexia treatment per week. She remained in the hospital for three weeks, during which time the pain and stiffness in the joints were so reduced that she could again care for herself. At the time of her discharge her blood pressure was 152/110. Since returning home she has continued the treatment and has improved so much that

Fig. 4. Case 5260. Left wrist showing some motion due to lessened calcium deposits.

she now can care for herself in every way and sew and knit.

5342: Female, aged 72 years: This was a case of atrophic arthritis of long standing. She complained of the great pain. She remained in the hospital for two months during which time she was given 200,000 units of vitamin D daily and one hyperpyrexia treatment per week. Her pain was entirely relieved and she insisted on returning to her home where the vitamin D therapy has been continued. Her physician reports that the improvement has continued.

5689: Male, aged 61 years: This is a case of chronic atrophic arthritis of four and a half years' standing. He has a long hospital record in Chicago, testifying that his condition was becoming more and more severe. He experienced severe and constant pain and nearly all of his joints were affected. He entered the hospital entirely incapacitated. He was given 200,000 units of vitamin D per day and one hyperpyrexia treatment per week. At the end of ten weeks in the hospital his pain was greatly relieved and some of his joints less rigid. The vitamin D therapy has been continued in his home. He has continued to improve and is now able to care for himself in every way.

5260: Male, aged 41 years: This is a case of arthritis deformans. The patient has a long record in Chicago hospitals and was progressively becoming rigid and experiencing so much pain that narcotics were necessary to enable him to rest. He entered the hospital on a stretcher, being totally incapacitated. Every joint in his body was ankylosed to some degree. During his stay in the hospital from October, 1935, to February, 1936, he received from 200,000 to 1,000,000 units of vitamin D per day. He was also given hyperpyrexia treatments once or twice each week. During the five months of hospital treatment the pain was so

Fig. 5. Case 5260. Left wrist immovable ankylosed.

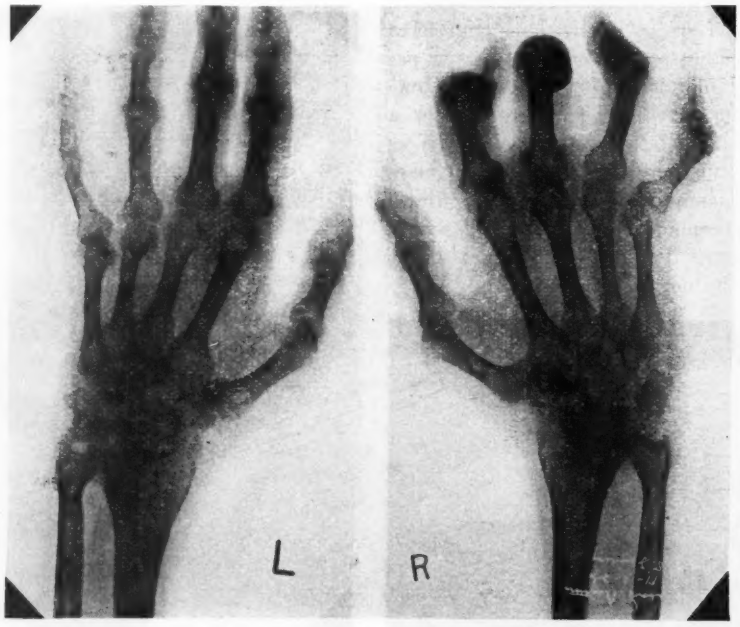

Fig. 6. Case 5260. Left wrist, particularly, x-ray showing flow of calcium away from deposited areas and cartilage restoration. There is now, one year from beginning of treatment, movement in a forerly completely ankylosed wrist.

relieved that sedatives were no longer necessary. His general state was greatly improved, having gained forty pounds of body weight. Some of his joints, particularly the knees and ankles, showed greater motion and none of his joints where ankylosed to any greater degree than at time of entry. His improvement was so great that he walked with assistance from the hospital. He has continued the vitamin D treatment in his home. At this time, after eight months of treatment, he not only dresses himself but attends to all of his personal needs. So far as we can tell the disease has been stopped in all of the affected parts of the body. A recent picture of the patient is shown. It will be noted that his knees are almost normal; his hips and back allow him to stand erectly; and his shoulders and neck allow rotation of the head and arms. It will be noted that his nutritional state is good. We hope for a complete cure in this patient.

SUMMARY

The use of mass charges of vitamin D per orem in the treatment of arthritis has been followed in a group of 27 private patients. In no case have uncontrollable, untoward symptoms been observed. The slight dizziness or nausea which develops in those patients receiving higher dosages, can be reduced or controlled by brewer's yeast. In severe cases of atrophic arthritis, the reduction or disappearance of pain was observed. The x-rays have shown remarkable reparative changes in the joints consisting of filling in of the rarefied regions and reconstruction of cartilage. In severe cases of hypertrophic arthritis, granular resorption of exostoses, particularly on vertebrae and reconstruction of cartilage takes place. Not a single one of this group has failed to respond in some degree to the high vitamin D therapy.

In this group not only were the symptoms of pain and reduced movement of joints relieved, but the general nutritive state was greatly improved by the therapy above outlined. This was manifested by the gain in weight, appearance and feeling of well being.

There is in the mass charge of vitamin D, a new therapeutic measure which appears to offer much hope in the treatment of arthritis and kindred conditions.

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3. Ertron.

ANKYLOSED JOINTS GENERAL

Case 5260: Oct. 22, 1935. Weight, 107 lbs.; height, 6 ft.; 6 years' duration; 2 years' complete helplessness, generalized immobility of joints with calcium deposits and ankylosis, pain positive. General laboratory routine showed negative, except blood sedimentation 31 mm. in 60 minutes and many immature corpuscular elements in blood.

Nov. 10, 1936. Sedimentation now normal, immature corpuscular elements disappeared after two weeks vitamin D. Weight now 150 lbs., locomotion without crutch or cane.

X-RAYS ARE OF SAME CASE

Right wrist had complete motion and freedom from pain in five months.

Left wrist began to move and function in motion at nine months.

All other joints seem to have gone through same restoration of function.

Patient able to lift and carry 75 lb. weight in addition of or to his own weight.

THE PRINCIPLES OF RADIUM THERAPY IN MALIGNANCY

FRANK EDWARD SIMPSON, M. D.

CHICAGO

The literature dealing with radium therapy is voluminous yet confusing and contradictory. Claims are often made for radium that are not justified.

One gets the impression from the pamphlets of commercial organizations which rent radium and sell radon "seeds" that radium treatment is simple and may be used by anyone. The exact opposite is the truth.

Radium therapy has become a very highly specialized and complex subject, requiring long study and experience both to avoid injuring patients and to select cases that are really suitable for radium treatment.

Especially in the treatment of cancer, in which the patient's life is at stake, it requires a large and expensive equipment and great skill to bring cases to a successful conclusion.

Ewing[1] says, "The wisdom of employing irradiation in cancer depends first of all on the competence and equipment of the operator." Unfortunately, as every one knows, the radium

Read before Section on Radiology, Illinois State Medical Society, Springfield, May 20, 1936.

therapist as well as the surgeon fails frequently to cure cancer.

Sometimes the failure of radium is due to the character of the disease; sometimes to the way in which the radium is used, or perhaps abused.

If greater success is to attend cancer therapy, there must be cooperation between the family doctor, the surgeon and the radium therapist.

The family doctor must see patients in time; the surgeon must operate in time; the radium therapist must treat them in time.

Only by such cooperation can there be much hope for a decrease in cancer mortality.

Clinical effect of radium rays. The main principle involved in radium therapy is that the radio sensitivity of certain neoplastic cells is greater than that of the normal cells surrounding the tumor.

The clinical effect of radium depends on the technic employed.

The quantity of radio active material, the screening, the distance from the neoplasm, the length of exposure and the type of neoplasm are some of the chief factors to be considered in the use of radium. All of these may be so greatly varied as frequently to render the technical application of radium a difficult problem even for the expert.

Wood and Prime[2] have shown experimentally that Beta rays are 6 to 8 times as lethal to the cancer cell as Gamma rays. We cannot agree therefore with those who restrict the use of radium and employ Gamma ray therapy only.

We believe, on the other hand, that Beta rays are often of the greatest value, as in the treatment of superficial eiptheliomas.

It is very important to estimate the exact distance of the radium from the neoplasm. The terms milligram and millicurie hours mean nothing whatever, unless all the factors that govern the technique and especially the distance are known.

When a tumor is radio sensitive, it may disappear under radium without visible inflammatory reaction—the so-called "selective" action.

Some cases of lymphosarcoma may be clinically cured in this way. With tumors that are radio resistant, such as squamous cell cancer of the lip, one must usually invoke the "inflammatory" action of radium.

The selective effect of radium should be used whenever possible in order to conserve normal tissues and spare the patient unnecessary discomfort. For the best effects of radium on a neoplasm there should be a good substructure of muscular and connective tissue.

Microscopic effects of radium rays. Radium rays act as "selective poisons to cell reproduction." Injury and destruction of the nucleus of the carcinoma cell is one of the chief effects of the rays. The cell is particularly sensitive during mitosis and especially at the culminating point of mitosis. There are, however, other changes of far reaching importance in the curative process. These consist chiefly of obliteration of blood vessels, stimulation of phagocytosis, production of fibrosis, etc.

In the radium treatment of cancer one relies, therefore, on two chief factors:

1. Direct action of the rays by which the equilibrium of the molecular structure of the cancer cell is disturbed resulting in its death.

2. Indirect action on the tumor bed so that the circulation is modified and local defense processes are stimulated.

Both of the above actions may be explained in terms of the absorption process.

The absorption of the gamma rays may result from the photoelectric effect, which means that a high speed Beta ray is ejected when the gamma ray encounters matter. There may be present the so-called Compton scattering, which produces not only a secondary Beta ray but a modified Gamma ray.

Both absorption processes mean the transference of energy from the incident Gamma or Beta ray beam to the tissues.

Treatment of the tumor bed. It has been demonstrated by animal experimentation that irradiation of the surrounding region in addition to irridiation of the tumor itself produces better results than when the tumor alone is treated. Clinical experience corroborates these experiments.

As a consequence of this knowledge, we no longer try to screen off the surrounding tissues by lead or gold screens but we always include in the irradiation all of the area adjacent to the tumor, provided the anatomical conditions permit.

The experiments of Lazarus-Barlow[3] and others have shown that the good effects of irradia-

tion may be increased by a certain prolongation of the time of irradiation.

By spreading the dose over several days or weeks, injury to normal tissues which reproduce slowly may be reduced while injury to cancer cells which reproduce rapidly may be increased.

In Roentgen therapy, Coutard[4] has stressed the utility of the multiple divided dose method.

Coutard's plan is to give in certain types of intraoral carcinoma daily exposures to Roentgen rays, maximal irradiation being arranged if possible in accordance with the estimated periodicity or recurrence of maximal sensitivity in the neoplasm.

In 1925, Holzknecht[5] said: "If one is fortunate enough to strike the right day for the second irradiation the effect is 2 or 3 times as great as when the total dose is given in one sitting. The difficulty lies in determining the correct interval of days."

In radium therapy the multiple divided dose method has been used almost from the beginning.

In 1921, the author[6] pointed out that in malignacy several intensive doses at suitable intervals are to be preferred to a single intensive dose.

We believe the intraoral application of radium in carcinoma of the buccal cavity is much to be preferred to Roentgen therapy.

In Roentgen therapy, the rays, if applied from the skin surface, pass through the structures overlying the tumor and may cause great damage to normal tissues. In radium therapy, the radium may be applied directly to the neoplasm from the inside of the mouth, so that overlying structures are relatively little or not at all damaged.

We wish to warn those who undertake to give the relatively large total doses of x-rays employed by Coutard and his followers. Little if anything has been said about the pain following the complete cycle of treatment recommended by Coutard or the ultimate results of these large doses—the so-called epidermicidal dose—on the skin and the underlying tissues. We predict that in a few years atrophy, telangiectasia, chronic, intractable, painful ulcerations and epithelioma of the skin, together with severe fibrosis of the underlying tissues may be found to result from a too slavish use of the Coutard method.

We have seen untoward results follow severe radium reactions as long as 15 or 20 years after the reaction has apparently healed, and we believe disastrous results may be anticipated, but in greater degree, from x-ray reactions.

Metastases. In the treatment of carcinoma, it is not so much the problem of the cure of the primary local lesion as it is the cure of the metastases that one has to solve.

Among the factors apparently favoring metastasis there are two—the microscopic structure of the tumor and traumatism—which we wish to mention briefly.

Microscopic structure. In 1920 Broders[7] presented evidence indicating that the nearer the cancer cell approached the normal, the less malignant was the tumor i.e. the less likelihood of metastasis. On the other hand, the more the cancer cell approached the embryonal type, the more malignant the cancer.

In addition, a large number of mitotic figures indicated increased malignancy. In this way Broders distinguished 4 groups or grades of malignancy, depending on the microscopic structure of the tumor.

Lacassagne[8] says:—"Attempts to classify cancers from small biopsies into more or less radio sensitive groups depending on the degree of differentiation of the cells or according to numerical enumeration of mitotic figures have not been uniformly successful.

"The histological characteristics of a cancer may vary in its different parts and this cannot be appreciated by examination of a small specimen which frequently represents only a surface biopsy. Since it is usually impossible to predict with certainty the radiation dose which will be needed to destroy completely a particular cancer, the largest dose compatible with maintaining the integrity of healthy tissues is usually given."

Traumatism. F. C. Wood[9] has shown that if animal tumors are massaged gently for a few minutes on successive days, the number of metastases to the lungs is greatly increased over those found in the controls.

Clinical experience has shown that methods of treating cancer, which traumatize without completely destroying it, may result both in increased local growth and the development of metastases.

Cancer may be traumatized in various ways, such as by rubbing, squeezing, partial excision, cauterization, electrocoagulation, etc. A com-

mon expression that one hears is "partially remove," "curette" or "cauterize" the cancer and then follow this treatment with radium.

We are entirely opposed to these procedures, not only because the neopasm may be stimulated and metastasis favored but because the best effects of radium are obtained when the tumor bed is conserved.

Examination of cancer patients. We have a great respect for lesions which may be cancerous. The older physicians used the term—"noli me tangere"—do not touch me—to characterize a cancerous lesion.

Long experience teaches that the approach to the examination of cancer should be as gentle as possible.

Cancer of accessible organs such as the skin, lip, tongue, buccal cavity, cervix uteri, etc., may usually be diagnosed by inspection alone.

Complete examinations are desirable, but they should be carried out so that the involved parts are not traumatized.

Diagnosis. Although one may frequently make a diagnosis of malignancy clinically, the diagnosis should be confirmed by the microscope. Errors are thus minimized and one is protected from future claims that cancer was not present. We have not infrequently seen cancer diagnosed and radium applied to or even implanted in a lesion, when further investigation has shown that the lesion was luetic, yielding only to anti-luetic treatment. On the other hand, lues may be diagnosed clinically and anti-luetic treatment given and persisted in almost indefinitely, when carcinoma is present but unrecognized.

These are perhaps the two most common errors which may easily be avoided by a biopsy. We believe the microscopic examination of tissue is more important than a positive or negative Wassermann.

The selection of cases. Shall one use surgery or radium in the treatment of cancer This question cannot always be definitely answered. We have always maintained that, with certain notable exceptions, operable cancer should be operated on. There may of course be some difference of opinion as to what is operable and inoperable. James Ewing once said that patients naturally prefer a non-operative method and will submit to it earlier. For this reason, perhaps, many cases have been treated with radium which experience has shown are not suitable for irradiation.

On the other hand, many patients are doubtless operated on today who would be far better off under radium.

Fortunately, it is possible to state in general terms the class of cases that the experience of the world in the last 25 years indicates are most suitable for radium.

Among the conditions in which it is justifiable to use radium, even though they are operable, are selected cases of cancer of the skin, lip, buccal cavity, tongue and the cervix uteri.

Almost every case is a problem in itself, however, and should be treated by a generous cooperation of the surgeon who is familiar with radium therapy and the radium therapist who is familiar with surgery.

We wish now to consider the radium treatment of a few common conditions in which radium has been found to be of value.

X-ray Keratoses. In the treatment of x-ray keratoses, we believe radium is superior to excision. Abbe[10] pointed out many years ago that small epitheliomas due to x-rays may be healed with radium.

Radium Keratoses. These are, of course, much less common than x-ray keratoses. We know of only one authentic case in which epithelioma supervened on a radium keratosis, although other cases have probably occurred.

About ten years ago, a physicist engaged in radium work developed a radium keratosis on his right index finger. In spite of many warnings, this was allowed to progress into an epithelioma which metastasized and finally caused death from lung involvement.

We have not found in the literature any mention of the fact that radium keratoses, the result of slight but long continued local exposures to radium, may be cured by giving a sharp dose with radium applied to the surface of the lesion.

In the case of a physician, engaged for many years in radium work, a number of radium keratoses developed on both thumbs and forefingers. Excision was performed but after a few years recurrence of the keratoses took place. Although amputation of the distal joints was suggested, we decided to try giving a sharp sub-epithelioma dose with radium. The result was good, the fingers now being free of keratoses. The nail of the right forefinger which had become thick-

ened, striated and friable, as the result of excision of a wedge of tissue from the flexor surface of the distal phalanx, has become almost normal, apparently as the result of the radium treatment of the keratosis.

We believe, therefore, the treatment of radium keratoses by radium itself is the method of choice.

Epithelioma of the skin. Most epitheliomas may be treated by radium. There are certain types of very extensive, deeply infiltrating, squamous cell epitheliomas which we believe should be excised.

For epitheliomas of the face, especially those affecting the eyelids, nose, and ears, radium is the method of choice. We always employ surface irradiations. We advise strongly against the use of "radium puncture."

The lip. With small lesions, we believe radium is preferable to surgery, partly because there is no deformity following treatment. With larger lesions, much depends on the judgment of the operator as to whether radium or surgery is indicated. If radium is used, we advocate surface irradiations with a minmum of 500 mc. which is applied daily for from 5 to 15 minutes until the dose has been given.

We advise very strongly against the implantation of radium needles of any type in carcinoma of the lip.

The buccal cavity. We believe radium should not be preceded by surgery, because of the unavoidable injury to the tumor bed.

We use, in almost all cases of carcinoma of the buccal cavity, surface irradiations rather than the implantation of radium needles or seeds."

The patient sits behind a heavy lead plate which is rolled between the operator and the patient. An applicator containing at least 500 or more mc. is laid gently on the growth for 5 minutes. This length of exposure is seldom exceeded. Treatments are given once or twice daily until the dose has been given. In addition, the growth is intensively treated with radium from the skin surface.

The Tongue. Cancer of the tongue should practically always be treated by "radium puncture" after a suitable amount of 3 minute, daily, surface irradiations with a powerful radium applicator, containing at least 500 mc. Formerly we were of the opinion that very advanced cases should receive only palliative treatment by irradiating the surface of the lesion and that "radium puncture" was not indicated when metastases were present.

Further experience has convinced us that, even in advanced cases, correct "radium puncture" gives more palliation than any other known medical or surgical measure.

We use lead radon tubules each containing approximately 0.5 mc. of radon which are implanted permanently in the tongue lesion. We published[12] a description of these tubules and the method of their use in 1932. We do not favor the use of radium needles which are implanted in the tongue and removed after the estimated dose has been given.

While excision of carcinoma of the tongue followed by radium treatment has been advocated by some surgeons, we are opposed to this method.

In our opinion, such a procedure is "putting the cart before the horse."

If columns of cancer cells persist at the edge after operation on the tongue, there is difficulty in eradicating them by irradiation.

The previous removal by excision or any other destructive method of a portion of the substance of the tongue takes away muscular and connective tissue necessary for the normal tissue reaction which is so essential for the best effects of radium. Few appear to realize the harm that may be done by cauterizing or incompletely excising cancer and then trying to cure it with radium, when the tumor bed has been irreparably damaged. We believe most radium therapists and surgeons of experience will agree with Lacassagne[9] who says, "there is no question that radium puncture is at present the most efficient method of treatment of these lesions. The difficulty of obtaining a clinical cure in cancer of the tongue is not due to the primary lesion but to the glandular metastases."

Metastases. In cancer of the lip, buccal cavity and tongue, we advocate conservative excision of the lymph nodes combined with irradiation of the nodes from the skin surface.

We advise against the implantation of radium or radon in carcinomatous lymph nodes. For a further discussion of this topic, the reader is referred to a previous paper by the writer.[6]

Cancer of the breast. Every surgeon knows that the chief danger to the patient in cancer of the breast lies in the metastases.

If the primary lesion can be completely re-

moved before metastasis has taken place, the patient may remain well.

In some quarters, the implantation of radium in the primary breast tumor has been advocated even in clearly operable cases. Why this practice should be recommended is a complete mystery. Does the implantation of radium offer any better chance of eliminating or destroying every cancer cell in the breast than surgical removal? Everyone with experience knows that it does not, while the traumatism and manipulation incident to the implantation of radium in a breast tumor must to every thinking mind spell —metastasis.

The unavoidable pain and reaction consequent upon "radium puncture" of the breast are certainly very distressing. Radium necrosis of the skin is also greatly to be feared.

In our opinion, operable cancer of the breast should be operated on. Radium is an invaluable adjuvant to surgery but it should be applied to the surface only—never implanted in the primary breast tumor or the recurrences.

Cancer of the cervix uteri. Although operations are still being performed, we believe radium is the method of choice in practically all cases of cancer of the cervix.

Preliminary treatment. The variety of unsurgical procedures that have been advocated in connection with the radium treatment of cervical cancer is astonishing and perplexing. If a squamous cell cancer were situated in the oral cavity, few would contend that it would be good surgery to irrigate it, to scrape or cauterize or electrocoagulate the surface or to insert a dilator in its substance and pry it apart.

Surgeons would agree that the opening up of lymph and blood channels by any of these procedures would in all probability cause rapid dissemination of the growth. Yet all these measures are being used at the present time prior to or during the application of radium to the cancerous cervix. Our experience indicates that it is not the cervical tumor but the occurrence of metastasis that is so frequently fatal.

We are opposed therefore to traumatic examinations, douches, "pulling down" or dilating the cervix, curetting, "coppering,"[11] cauterization, electrocoagulation, partial operation, etc., preliminary to or during the course of radium treatment.

European Technic. A technic used for cervical cancer in a foreign clinic and widely copied in this country consists partly of the following procedures:

Treatment is begun by "disinfection" of the vaginal cavity, dilatation of the cervix and the introduction into the uterus of 3 radium tubes arranged tandem. At the same time, vaginal irradiation is accomplished by placing from 2 to 5 radium tubes in the vaginal vault. The intrauterine applicator and the vaginal tubes are removed daily and disinfected. A vaginal douche is given and the applicators are reinserted. Irradiation is carried out over a period of 5 consecutive days.

As a result of this technic, one is not astonished to learn that 2% of primary deaths are caused by infection and that "phlebitis, pelvic cellulitis, periuterine abscess and pelvic peritonitis are occasionally met with." It is perhaps needless to say that we do not use this technic because of its evident dangers.

"Radium Puncture." Although recommended in some quarters, we are absolutely opposed to radium puncture as the primary line of attack in carcinoma of the cervix. Our reasons in part are as follows:

First, there is great danger of introducing infection into the deeper parts of the pelvis. A number of deaths from infection following this procedure have been reported. Any method that carries this element of danger ought to be abandoned when safe and equally efficient methods are available. Second, there is a great possibility of causing severe central necrosis without complete destruction of the carcinoma.

It is sometimes said that needles having thick gold or platinum walls do not produce necrosis. This is an absolute fallacy. No tissue can withstand death if placed sufficiently long in proximity to radium.

In patients treated with radium needles or by cauterization who have come subsequently under our observation, extreme pain is frequently complained of. One often sees in the vault of the vagina an area of necrosis surrounded by a zone of apparently inflammatory tissue, in which however, biopsy shows cancer cells. One is then confronted with a difficult and dangerous dilemma.

Shall one ignore the radium necrosis and treat the carcinoma still present or shall one delay

local treatment until the radium necrosis has somewhat susided?

Under these conditions, one must be guided by experience because no constant rule of procedure can be laid down.

Unfortunately, such cases usually go on to a fatal termination under any method of treatment.

It is, of course, true that if a carcinoma is very small and confined to the cervix; if infection is slight and every carcinoma cell is destroyed by the radium needles, a cure may result.

We believe, however, that better results may be obtained by methods that are neither painful nor dangerous to the patient.

The author's technic. The method which we advocate consists essentially in an attempt to follow ordinary surgical principles in the application of radium.

One must consider infection, traumatism and the method of applying the radium.

Infection. The cancerous cervix is practically always infected.

If the discharge is dammed up, infection may spread to the parametria or peritoneum. We are opposed, therefore, to starting the treatment by plugging the cervix with a string of radium tubes. Fatal infection has followed this procedure.

Traumatism. We believe that traumatism of any kind to the cancerous cervix militates tremendously against the patient's permanent recovery by favoring metastasis.

We abstain therefore from all preliminary treatment such as douches, curettment, cauterization, etc., believing that such procedures are both futile and dangerous.

Method of applying radium. The technic, of course, must be varied to suit individual cases.

Before we attempt to invade the interior of the cervix, we irradiate the end of the cervix and lateral vaginal fornices with approximately 1000 mc. of radon by giving short applications each lasting 15 to 30 minutes on successive days. The rectum is protected with a gold screen.

Under this treatment hemorrhage rapidly ceases, infection quickly subsides and the cervical canal, if obstructed by the growth, opens up spontaneously under the influence of the irradiation.

We then introduce into the uterine canal, without dilatation of the cervix, a flexible lead screen only 4 mm. in diameter and containing not less than 500 mc. of radon. A single intrauterine treatment lasting 3 or 4 hours is given.

We rely very largely on the selective rather than the caustic action of radium so that there is seldom any necrosis of the cervix or adjacent tissues.

Hospitalization is unnecessary, most patients continuing their usual occupation.

Further details of this technic may be found in previous papers by the author.[6]

Much of the bad reputation that radium has in some quarters is due largely to its use by those unfamiliar with its possibilities for evil as well as good.

Correctly applied, radium is one of the most valuable agents ever introduced into medical practice.

Improperly used, its bad effects may far overbalance the good that may be done.

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DISCUSSION

Dr. Roswell T. Pettit, Ottawa: Dr. Simpson has covered the whole field of radium therapy and it would be impossible to discuss the paper in toto, but there

are two or three points I think I would like to emphasize.

I believe the basic principle of the use of radium in the light of our present knowledge as it has been developed at the Radium Institute in Paris, the fountain head of our knowledge of radium therapy, is the use of small amounts of radium over a prolonged period of time; getting all the cancer cells during some phase of mitosis; believing that their period of life cycle is some six or eight days. The treatment time should be a matter of days or weeks rather than a few hours. This idea of prolonged application is in use at the Radium Institute in Paris; at Stockholm Memorial Hospital, New York, and various other places throughout the world, it is the accepted method.

The method of treatment which Dr. Simpson uses, a thousand millicuries for ten or fifteen minutes, I hardly believe would meet the requirements which have been worked out by those who have given this study their attention.

I had an opportunity in 1933 to spend two months at the Radium Institute in Paris. In 1928 I spent about six or eight weeks at the Radium Hemmit in Stockholm. In Stockholm they use radium practically exclusively. In Paris, using a heavy filter, high voltage roentgen rays are applied over a prolonged period of time. I saw a number of these patients in both institutions who had been treated several years previously. The character of the skin was almost exactly the same, whether radium had been used or this very high filtered x-ray, but the character of the skin is decidedly different from what had been my experience in the use of x-ray in the treatment of carcinoma up to that time where we had used about half a millimeter of copper. The difference in the filter of half a millimeter of copper and two millimeters of copper made a very decided difference. For that reason I feel, in spite of the fact we have no scientific proof of the fact that the wave length has an important bearing upon the biologic effect and after having observed the work in Stockholm, in Paris and from my own experience in the treatment of my own cases, that wave length is a very important factor and that we are going to have to recognize it. I realize that Francis Carter Wood maintains emphatically as far as fruit flies are concerned, one wave length is the same as another.

In x-ray therapy we are subconsciously approaching the type of treatment given with the radium bomb at much less expense and just as or even more effectively.

E. G. C. Williams, M. D., Danville: There are two points of which the doctor spoke which I would like to emphasize. One is that the idea of milligram or millicurie hours means literally nothing unless all factors concerned are known, which indicates the fact that we have absolutely no concrete unit of measurement for radium therapy. In the matter of measurement in x-ray therapy we have advanced much further through use of an absolute unit of measurement. Because of this lack of a radium unit there is a demand that the man using radium have a definite knowledge and trained experience as the only basis for radium work.

Beyond any question there have been miracles and wonders worked with radium in hands of those who know how to use it. By the same token, there has been a lot of very bad work done by those who just take radium and use it according to the printed pattern without knowledge of the background.

The other thing I would like to mention is the end result of the Coutard treatment, the hyperintensive treatment which seems only an increase in dosage over the idea proposed by Dr. Pfahler many years ago. If any of our patients who have had the Coutard treatment are alive long enough to have remote skin changes years after, I believe that is the only test that our treatment has been successful, because these people with carcinoma of the larynx and similar conditions are people without any other hope. I assure you I will take the responsibility of skin ulceration, skin change or anything else if by the use of this method I can keep these patients alive long enough to develop these remote effects.

Dr. Simpson (closing the discussion): I enjoyed the discussion and I think all that has been said is pertinent to the subject. Of course, cancer of the larynx should be taken out, if operable. If it is inoperable, I believe it is right to give severe x-ray or radium treatment. I do not know that the x-ray results would be any worse in late years than the redium results but the results of late radium reactions in the skin are bad and I believe with x-ray too there will be sooner or later very unsatisfactory results.

As to the method employed in Paris, I sometimes think large institutions fall into the habit of using a routine technic that either has not been clearly thought through or has been modified because of economic consideration. We cannot plug the cervix and put radium needles in without great danger. As I do not want to have anyone die as the result of my treatment, I am not much interested in this technic when better or at least as good results may be obtained without danger by another method.

As physicians with minds of our own I do not believe we should permit Paris or Stockholm to influence us to such an extent that we can not use our own judgment. I believe the things I have pointed out in their technic to be really dangerous and I am much opposed to them.

A pathologic trilogy consisting of erythematous lupus, lichen planus and psoriasis has been described. In this syndrome pruritis is a prominent symptom. The author reports that injection of Pituitrin controls this symptom "as if by magic." It was 100 per cent effective in ten acute cases described and 50 per cent effective in the chronic type. Roussel, J. N., *South. M. J.* 29:811 (August) 1936.

Absence of vitamin B_1 in the stomach contents of severely diabetic patients was revealed by spectrographic studies. This finding was in marked contrast to the findings in normal patients. A disturbance in vitamin B_1 metabolism is believed to be a prominent characteristic of diabetes mellitus. Lajos & Gerendas, *Z. exp. Med.* 98:739 (June 30) 1936.

SOME BASIC OBSERVATIONS ON THE TREATMENT OF GONORRHEA

LEON M. BEILIN, M. D.
CHICAGO

The treatment of gonorrhea is one of the most vexing problems of medicine. For a disease entity of known etiology, so common and widespread, gonorrhea is manifestly lacking general uniformity and standardization of treatment.

Those of us who have had the opportunity to observe the treatment of this infection in the army, clinics and private practice will undoubtedly agree that, while much progress has been made in recent years in the treatment of gonorrhea, our present therapeutic measure of combating it, in both men and women, particularly in the latter, are still a long way from being ideal.[1]

Our present-day treatment of gonorrhea is still as empirical as it has always been. For centuries the medical profession was endeavoring to cure gonorrhea through a direct gonococcidal action of some chemical, by means of "therapia sterilisans magna", though this is entirely contrary to the whole rationale of the disease. If human urethrae were a simple tube without glands, crypts or rugae, it would be an easy matter to devise some mechanical or chemical washout which would kill the gonococci *in loco morbis*. Unfortunately, nature does not work in such a fashion. Finger, a co-worker of Neisser, in his treatise on the pathology of gonorrhea, written almost fifty years ago, had stated that when gonococci produce the inflammatory changes typical of the infection, they are already below the surface of the mucosa of the urethra, far beyond the reach of any antiseptics. Failure to recognize this basic fact and persistence in the use of local antiseptics to the point of irritation is responsible for many cases of chronicity and complications of gonorrhea.

There is no ideal drug in the treatment of gonorrhea, for the present, at least, since the same chemical action that forms a metal protein compound of the microplasm will also form a metal protein compound of the protoplasm, and the same force that oxidizes a microorganisms will also injure the tissues. It is entirely possible that a chemical in time will be developed that will exert a parasitotropic action on the gonococcus without having organotropic effect on the tissues of the host, but to date no compound has been developed which fulfills such requirements.

We must confess that in our arduous search for specifics we have often sinned against the cardinal warning: *nil nocere!*, and instead of treating the disease we have maltreated the patient.

We should not forget the "vis medicatrix naturae" and the admonition of Ricord, Fournier, Roux et al, "laissez couler" (let it run), rather than treating it "cum furore."

It can be justly said, that there is hardly a drug or combination of drugs that has not had its advocates and opponents in the treatment of gonorrhea. Each urologist lauds his pet drug today, only to discard it tomorrow for another would-be specific. The commercial houses, taking advantage of this, have flooded markets ad libitum with a great variety of nostrums for alleviating the ills of gonorrheal patients. These are mostly commercial butterflies—beautiful to look at, but of little value.

On theoretical and experimental bases, the silver salts, especially their colloids, seem best to comply with the requirements and desiderata for an efficient gonococcide. The susceptibiity of the gonococcus to silver compounds is conspicuous, though not actually specific. Schwartz and Davis[2] of Johns Hopkins University investigated the action of various drugs on gonococci, in vitro, and have found that:

1. Silvol, argyrol, protargol, cargentos have definite, but not high germicidal value against the gonococci.

2. Phenol, tricresol, potassium permanganate, zinc sulphate, boric acid in dilutions tolerated by the urethra, have too little germicidal value against the gonococci to be useful in the treatment of gonorrheal urethritis.

3. Chlorazene has a moderate germicidal value.

4. Potassium mercuric iodide has high germicidal value against the gonococci, as dilution of 1:40,000 kills them in twenty minutes. This solution is rather toxic to the urethra.

5. Potassium permanganate in 1:4,000 dilution has failed to kill the gonococcus in twenty minutes. Gottlieb and Freeman[3] have shown that silver nitrate, in one per cent. solution, had

Read before Section on Public Health and Hygiene of the Illinois State Medical Society, Springfield, May 20, 1936.

failed to prevent the growth of gonococci in the culture media in 30% of their cases.

These laboratory experiments, in vitro, evidence the therapeutic limitation of chemical sterilization of gonococci in vivo, where they are further protected from the disinfectants by the forces inherent to bacterial habitation in the tissues of man. In general, the usefulness of any chemical agent, in vivo, is always limited by its toxic and irritant effect upon the tissues.

On an empirical basis, however, of all the chemical disinfectants in vogue at the present for the treatment of gonorrheal urethritis, potassium permanganate is most widely esteemed by the majority of the continental and American urologists who usually employ it by the Janet method of urethro-vesical irrigation.

The rationale of this treatment is not that of disinfection but merely that of mechanical cleansing, tending to the production of hyperemia, serous effusion and local leucocytosis. This method, when properly employed, is less traumatizing and physiologically more correct than the antiseptic method, which aims at the destruction of gonococci, in loco morbis, by means of injection of various germicides with a hand syringe.

The irrigation is manifestly a more rational treatment of total urethritis, i.e. of anterio-posterior involvement of the urethra, which, according to Janet, Keyes and others occurs in 60-80% of all gonorrheal infections, than the injection method. Injections tend to traumatize the urethra, causing strictures, paraurethritis, etc., owing to the difficulty of regulating the amount of liquids introduced into the urethrae, which differ in their capacities in various stages of gonorrheal infection. "Urethral syringe," said Janet, "is a pump without a manometer," and he advocates discarding the use of the urethral syringe, a method as useless as it is dangerous.[4]

While accepting Janet's dictum in principle, we however believe that it is not advisable to institute the deep irrigations at the onset of urethritis, but prefer to wait until acute symptoms subside; urethral discharge, strangury, dysuria lessen, and the urine become more opalescent. Complications of acute urethritis are not contraindications for total irrigations per se. To the contrary, in cases of prostatitis, vesiculitis and epididymitis, posterior urethritis usually being present, in our experience, the deep irrigation shortens the duration of the inflammatory process. Ballenger, stressing continuous, uninterrupted treatment of the entire urethra during complications, states that "it is necessary to continue the irrigations regardless of the occurrence of epididymitis, but precisely on account of its presence."[5]

Obviously, I do not wish to imply that I regard the Janet method of irrigation as a final development, le fait accompli, of the Neisserian therapy, but, from years of observation, I believe it to be more rational than other accepted methods, namely, the antiseptic method of syringing or that of "laissez couler" of letting it run.

Internal Medication: The oral administration of urinary antiseptics has not proved sufficiently beneficial to warrant their use in the treatment of gonorrhea. Of the dyes, the best known are pyridium and hexylresorcinol. The council of Pharmacy and Chemistry of the American Medical Association has recently concluded that the claims made for pyridium were not warranted. Other investigations[6] further support the conclusions that neither of these compounds has any bactericidal or bacteriostatic action upon the gonococcus.

Some of the older urinary sedatives, such as oil of sandalwood and copaiba are still widely used, not for their bactericidal effect upon gonococci, but for their proven anti-inflammatory action upon the urethral mucosa and for diminishing the spasm of the smooth muscles of the urethra. However, I do not employ balsamics routinely and do not consider them as indispensable.

In our attempt to find new lines of attack, hyperpyrexia, vaccines, serums, enzymes, foreign proteins, etc., were added to the gonococcidal armamentarium with varied degree of success.

Therapy by Heat. Clinical evidence indicates that heat applied locally in almost any form has beneficial effect upon gonorrheal infection. The effect of heat, probably, is two fold, the non-specific one, increasing bodily resistance to the invading organism, and, a specific one, of killing or attenuating the gonococcus. However, the minimum degree of heat required for biologic destruction of the gonococci, in vitro, has not been definitely established. Different strains of gonococci are known to possess individual variations in their resistance to high temperatures. Recently Goldberg, Nikolaievskaia, Sheovindt,[7]

et al., have shown experimentally that the majority of strains of gonococci can withstand successfully temperature of 42 to 43C. (106.4 to 109.4F.), for a period of 6 to 8 hours, while the gonococci grown anaerobically have survived at the temperature of 45C. (113F.). Clinical significance of these laboratory findings is emphasized by the fact, that in the latent and chronic stages of gonorrhea, the gonococci are usually found in anaerobic states.[8] Various methods have been used in the attempt to kill the gonococcus by heat, principally in the treatment of women, inasmuch as they constitute a group in whom other methods of treatment are less satisfactory and in whom the tissues are less sensitive to heat than are those of the male urethra. Surgical diathermy and actual cautery have proven especially beneficial in the treatment of chronic gonorrheal endocervicitis, particularly when the destruction of tissue and the evacuation of cysts is desired.

Though a variety of special forms of heat appliances for various organs involved in gonorrhea has been devised and high pressure salesmanship methods on the part of manufacturers have turned the attention of the medical profession to this type of therapy, the results, in terms of cure, in a considerable series of cases of gonorrheal infection are still lacking, not convincing and inadequately controlled.

In eighty-five cases of gonorrheal epididymitis which I[9] have treated by local diathermy alone, there was an average of 16.2 sick days against eleven days for one hundred and twenty cases treated with the intra-epididymal injections of the patients' whole blood. It seems, that there is still much to be learned about the efficacy of local heat therapy in gonorrhea.

The same may be said about general hyperpyrexia in the treatment of this infection. In spite of enthusiastic reports from some quarters,[10] a careful perusal of the literature discloses a paucity of well controlled and checked series of clinical cases or authenticated evidence of the actual thermal destruction of gonococci and of their toxins in the tissues. Fever therapy may in time prove a boon to the gonorrhea patients, as it did to the paretics, but, for the present, we should reserve our enthusiasm.

Vaccine Therapy. In this country gonorrheal vaccines are credited by most specialists with very limited usefulness, usually only in chronic and complicated cases. Undoubtedly, they are used less now than formerly. Both gonorrheal vaccines and serums were omitted from "The New and Non-Official Remedies," since in the opinion of the Council of Pharmacy and Chemistry of the A. M. A. there is not sufficient evidence of their therapeutic value.

As to the use of Corbus-Ferry filtrate in the treatment of acute gonorrhea, my personal experience is not conclusive, though in chronic cases, I believe it merits favorable consideration. The full evaluation of the non-specific proteins, enzymes, etc., in the treatment of gonorrhea should not be made at this time. My observation is that their chief field of usefulness, for the present, lies in the treatment of complications of this disease, particularly, epididymitis and eye lesions.

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DISCUSSION

Dr. H. J. Burstein, Decatur: Dr. Beilin is to be complimented on his straightforward presentation of the subject. The absence of a uniform type of treatment and the many innovations in therapy that are grasped as a possible new type of cure, only to be discarded after sufficient clinical trial, are ample evidence of the inadequacy of present methods in the treatment of gonorrhea.

While the newer vaccines and filtrates may have tremendous possibilities with further development, I do not feel that any of the now available products have attained any high degree of specificity in the cure of this condition. While the use of these preparations is rather widespread at this time, in my limited experience I feel that biologic therapy is of greatest benefit in certain chronic cases, and in these, must be given discriminately. Pelouze and Herrold have pointed out

the danger of overdosage, and undoubtedly many cases of chronic gonorrhea may be attributed to a lowering of the defensive mechanism by over zealous vaccine administration.

The use of artificial fever whereby the individual is subjected to a temperature of 106°-107° for from 4-6 hours at 3-4 day intervals should, in my opinion be reserved for cases with systemic complications, and especially when there is a complicating arthritis. This treatment unquestionably has a favorable influence on the disease in all stages, but should be reserved for such cases as have been mentioned and those refractive to the usual methods of local therapy. Artificial fever therapy is not without some element of danger, as deaths have been reported following intensive fever treatment.

In closing, just a few words about customary local treatment in acute gonorrhea. The local injection of antiseptics, using 3-5% mild silver proteinate, ⅛-¼% strong silver proteinate in normal saline, or 1-4000 acriflavine solution is sufficient if done carefuly once, and not more than twice daily. Too frequent injections or the use of stronger, irritating solutions have proven to be the source of many complications, especially in inducing posterior urethritis with its sequelae. Lastly, hyperacute inflammation calls for a prompt cessation of local treatment, bed rest, alkalinization and sedatives, and in even the borderline severe cases, temporarily discontinuing all local treatment will lessen the incidence of serious complications.

Society Proceedings

COOK COUNTY

CHICAGO MEDCIAL SOCIETY

Regular Meeting, Wednesday, December 2, 1936

PROGRAM

Allergy in Childhood.

I. Harrison Tumpeer.

The General Treatment of Allergy.

Harry Huber.

The Importance of the Recognition of the Minor Allergies.

Milton B. Cohen, Cleveland, Ohio.

Discussion opened by Frank L. Foran.

Regular Meeting, Wednesday, December 16, 1936

PROGRAM

Arthritis.

Laurence H. Mayers, M. D.

The Present Status of the Treatment of Arthritis.

Maurice F. Lautman, M. D.
Hot Springs, Arkansas.

GREENE COUNTY

Regular Meeting of the Greene County Medical Society held in Roodhouse, Friday, December 11, 1936.

The program consisted of a clinic conducted by our own members. Dr. H. W. Smith of Roodhouse presented a very interesting case of Parkinson's Disease in a man of 20. A year ago this patient was entirely helpless, but has shown a very remarkable improvement under the atropine treatment, and is now able to go about ordinary work in a fairly satisfactory manner.

Dr. A. D. Wilson of Carrollton presented a patient who was suffering from sporotrichosis and called attention to the decided improvement under potassium iodide in liberal doses.

Dr. Bulger of Greenfield reported a case of osteosarcoma. These cases were thoroughly discussed by those present. Dr. T. B. Knox of Quincy, Illinois, Councilor of the Sixth District, gave us a practical talk on the economic side of the Doctor's work, with special reference to the medical care of the unemployed and indigent.

The membership voted in favor of the organization of a Women's Auxiliary to our County Medical Society.

Election of officers resulted as follows:

President, Dr. C. O. Bulger of Greenfield; Vice-President Dr. E. W. Thomas of Roodhouse; Secretary and Treasurer, Dr. Wm. H. Garrison of White Hall; Censor, Dr. Paul B. Bauer of White Hall.

It is worthy of note that every member of our society was present except one, a splendid record for any society. It is also worthy of note that the Greene County Medical Society is one of the 100% societies of the State, which is another commendable item and is proof that even though it is a small society (only fifteen members) it is wideawake and alert on matters that affect the welfare of the medical profession at large.

The next meeting will be held in Greenfield on Friday, January 22, 1937.

Wm. H. Garrison, Secretary.

KANKAKEE COUNTY

On December 11 the physicians of the Kankakee County Medical Society celebrated the 45th anniversary of the society with a dinner at the Kankakee Country Club. Thirteen physicians in the county who have been in practice for over 40 years were given formal recognition. They are: Drs. U. A. Bedard, E. D. Bergeron, J. A. Brown, A. S. Eshbaugh, C. W. Geiger, J. A. Guertin, F. C. Hamilton, A. N. House and Dr. Phelps of Kankakee; Dr. J. V. Lewis of Momence, Dr. G. W. Van Horn of Grant Park, Dr. S. R. Walker of Chebanse and Dr. W. A. Worstall of Aroma Park. Special recognition was given Dr. Van Horn who began practice 61 years ago and to Drs. Bergeron and Eshbaugh who have been practicing over 50 years.

Dr. S. R. Walker, Chebanse, was elected President, Dr. G. W. Morrow of the Kankakee State Hospital, Vice-President, Dr. E. G. Wilson, Kankakee, Censor and Dr. C. A. Perrodin, Kankakee, Secretary-Treasurer.

The principal address of the evening was by Dr. LeRoy H. Sloan of Chicago whose words, partly humorous, were on "Modern Docsology.". Dr. S. R. Walker, one of the original members of the society

told about the organization of the Kankakee County Medical Society in 1891. Dr. C. W. Geiger related his early experiences in the practice of medicine 40 years ago.

Yours very truly,
C. A. Perrodin, Secretary.

Marriages

THOMAS F. AHEARN JR., Chicago, to Miss Mary Doolin of Hammond, Ind., recently.

JOSEPH SLOAN BELL to Miss Elizabeth Webb Russell, both of Hoopeston, Ill., in Chicago, December 3.

PETER A. ROSI to Miss Gina Vanna, both of Chicago, recently.

Personals

Dr. Julius H. Hess addressed the Englewood Branch on "Clinical Procedures in Pediatric Practice," December 1.

Dr. Percy Starr Pelouze, Philadelphia, among others, discussed gonorrhea before the Chicago Urological Society, November 19.

Dr. M. Herbert Barker, Chicago, discussed pneumonia before the Lee County Medical Society, November 16.

At a meeting of the Chicago Pathological Society, December 14, Dr. Edward L. Compere, among others, spoke on "Pathology of the Spine."

The McHenry County Medical Society was addressed, November 19, by Dr. Lester E. Bower, Chicago, on contagious diseases.

The Chicago Pediatric Society was addressed December 15, among others, by John Hays Bailey, Ph.D., on "Observations on the Epidemiology of Certain Streptococcic Diseases."

Dr. Leon Unger discussed the subject of "Allergy" at the meeting of the Maricopa County Medical Society, Phoenix, Arizona, on Monday, December 21, 1936.

Dr. J. P. Greenhill prestnted a paper on "Recent Progress in Obstetrics and Gynecology," December 15, before the Evansville Post Graduate group.

At a meeting of the Winnebago County Medical Society in Rockford, December 18, Dr. Edward L. Cornell, Chicago, spoke on "Newer Developments in Obstetrics."

News Notes

Dr. Clark W. Finnerud, Chicago, addressed the DuPage County Medical Society in Naperville, November 18, on "Diagnosis and Treatment of Common Skin Diseases."

At a meeting of the Chicago Society of Internal Medicine, December 15, the speakers included Dr. Walter J. R. Camp on "Influence of Epinephrine on the Distribution of Potassium in the Body."

Dr. William P. Healy, New York, addressed the Chicago Gynecological Society, December 18, on "The Use of Radium and X-Rays in Gynecology."

A symposium on bronchiectasis was conducted before the Rock Island County Medical Society at Moline, November 10, by Drs. Paul H. Holinger and Eugene T. McEnery, Chicago.

Dr. Heinrich Finkelstein, director, Municipal Children's Hospital, Berlin, Germany, addressed the Chicago Laryngological and Otological Society, December 7, on "Mastoiditis in Infants."

At a meeting of the Chicago Surgical Society, December 4, the speakers included Drs. Henry N. Harkins on "Mesenteric Thrombosis" and Harry E. Mock, "Certain Intra-Abdominal Lesions Simulating Malignancy."

At a meeting of the North Shore Branch, December 1, the speakers included Drs. Herbert A. Sacks on "Crisis in Addison's Disease Simulating Coronary Thrombosis" and Robert W. Keeton, "Problems in Malnutrition."

The Sangamon County Medical Society was addressed in Springfield, December 3, by Dr. Arthur Steindler, Iowa City, on "Low Back Pain: Contribution to Differential Diagnosis," and Hugh J. Graham, Jr., J.D., "The Social Security Act."

Dr. Howard K. Gray, Rochester, Minn., discussed "Surgery of Peptic Ulcer and Its Complications" before the Evanston Branch of the Chicago Medical Society, December 3, and Dr. Arthur R. Colwell, Evanston, Ill., "The Use of Protamine Insulin in the Treatment of Diabetes."

Dr. Merritt Paul Starr, Chicago, discussed "Endocrine Treatment Problems of the Adolescent Period" before the Will-Grundy County Medical Society at Joliet, November 25. At a meeting of the society, November 18, Dr. Eugene F. Traut, Chicago, spoke on arthritis.

A bronze plaque in the lobby of the Kane County Spring Brook Sanatorium, Aurora, was dedicated, December 6, to the memory of the late Dr. Imas P. Rice, superintendent, who died April 23. Dr. Rice, the first superintendent of the hospital, had held the position since March 10, 1921.

At a meeting of the North Side Branch, December 3, Dr. James B. Herrick read a paper entitled "Dr. Charles T. Parkes as I Knew Him," and Dr. Austin A. Hayden, "Biography of Charles T. Parkes." Drs. Frederick W. Madison and Theodore L. Squier, Milwaukee, discussed "The Role of Sensitivity to Drugs in the Production of Agranulocytosis."

At a meeting of the Adams County Medical Society in Quincy, November 9, Dr. Carl F. Vohs, St. Louis, discussed "Medical Security for the People by the Profession," and Mr. Ray F. McCarthy, St. Louis, "Interpreting Medical Leadership by the Profession."

Dr. Herman L. Kretschmer addressed the Highland Park Physicians' Club, Detroit, Michigan, on December 2nd. Subject: "The Treatment of Bladder-Neck Obstruction by Transurethral Resection."

Dr. Gatewood gave a talk before the North Central Illinois Medical Association at its annual meeting held December 1 at Streator, Illinois. His subject was "Lesions of the Ileum."

Dr. Herman L. Kretschmer was the speaker of the evening at the Annual Meeting and Frolic of St. Joseph County Medical Society, December 3, at Elkhart, Indiana. His subject was "A Doctor Looks at Europe," illustrated with lantern slides and moving pictures.

Dr. Philip A. Halper addressed the Annual Sight Saving Round Table State Meeting sponsored by the Illinois Society for the Prevention of Blindness on "What Every Sight Saving Teacher Should Know About the Diseases of the Eye." at the Palmer House, November 23, 1936.

Drs. Don C. Sutton and James T. Case will present papers on "The Old Myocardial Case with Reference to Treatment and Diagnosis," and "Some Phases of Colonic Diagnosis," before the Livingston County Medical Society at Pontiac, Illinois, the evening of December 17th.

Dr. Julius H. Hess attended the Georgia State Pediatric Society meeting at Atlanta, Ga., December 9th and 10th. He presented the following papers: "The Present Status of Serum Therapy," and "Sinus and Teeth as a Source of Systemic Infection in Childhood."

Dr. Leo Gamburg, Senior Physician on the medical staff of the East Moline State Hospital for the past five years, resigned December first to enter the general practice of medicine and surgery in Moline, Illinois. He will also pay special attention to nervous and mental diseases.

Dr. Harold Swanberg, Quincy, Illinois, Editor of the Radiologic Review & Mississippi Valley Medical Journal, will address the Jefferson-Hamilton County Medical Society, at Hotel Emmerson in Mt. Vernon at 6:30 P. M., on January 11, and the Pulaski County Medical Society, at Hotel Halliday, Cairo, at 7:00 P. M., on January 29. Dr. Swanberg will give an illustrated lecture on "Radium Treatment of Benign Uterine Hemorrhage."

—The Illinois Association for the Crippled has been granted a charter and its first meeting was November 5. Paul H. Fesler, superintendent, Wesley Memorial Hospital, Chicago, is president, and Lola M. Armstrong, executive secretary.

—The second annual meeting of the members of the American College of Physicians of the state of Illinois, outside of Chicago, was recently addressed in Peoria by Drs. Allen K. Krause, Baltimore, on "Future Possibilities of the Diagnosis of Tuberculosis"; Horace W. Soper, St. Louis, "Clinical Significance of Milk and Cholesterol in the Dietary of Man," and Frank Smithies, Chicago, "Certain Ulcerative Lesions of the Bowel, Their Recognition and Management."

—The faculty of Rush Medical College recently voted to abolish the requirement of the fifth year for the degree of doctor of medicine, effective December 15. Certain additional provisions were made for students who have received the four year certificate since 1934 and who never received their degree because of illness and for students who received the certificate in the past year who were either not under contract to a hospital or whose contract could be altered by the hospital concerned to permit them to receive their degree before completing their internships.

—The Adams County Medical Society held a special meeting and dinner, November 24, to

honor Drs. Melinda C. K. Germann and J. W. Edward Bitter, who have completed fifty years in the practice of medicine in Quincy. Dr. J. Carl Steiner was toastmaster. Gold wrist watches were presented to both physicians. Speakers included Drs. Francis L. Reder, St. Louis, and Henry J. Jurgens, and three physicians who also have completed fifty years of practice: Drs. Levin H. A. Nickerson, Edmund B. Montgomery and William W. Williams. Dr. Germann graduated from the Quincy College of Medicine in 1886 and has been active in the civic life of the community. Dr. Bitter also graduated from the Quincy College of Medicine; he served two terms as president of the Adams County Medical Society in 1929 and 1933 and as secretary from 1922 to 1923.

—The present exhibit of the Chicago Medical Society in the Marshall Field and Company Annex Building is based on a recent report issued by the state department of health which showed that during the Christmas 1935 holidays the following cases in Illinois were in quarantine:

Smallpox	25	Scarlet fever	2,451
Typhoid	27		
Diphtheria	304		
Whooping cough	851	Total	3,622

The exhibit shows a child quarantined at home with scarlet fever, looking out at other children playing in the snow. Signs in the window say "This child was not protected" and a card by the children outdoors says "These children are protected; are yours?" A poster printed in red and green says "Christmas Gifts for Children Should Include Immunization Against Contagious Diseases."

—State commanders from ten Central Western states organized in the Women's Field Army of the American Society for the Control of Cancer met at the Chicago Woman's Club, November 30, to discuss plans for "enlistment week," March 21-27. "Early cancer is curable; fight it with knowledge" is the slogan of the field army, which seeks to enroll members for an enlistment fee of $1. The money will be used to defray the expenses of disseminating information about cancer. It is hoped that this educational campaign will bring early cases to competent physicians for treatment. Speakers at the meeting included Mrs. Grace Morrison Poole, national adviser of the army; Dr. James P. Simonds, professor of pathology, Northwestern University School of Medicine, and Dr. Frank L. Rector, Evanston, field representative of the American Society for the Control of Cancer. Commanders were present from Colorado, Indiana, Kansas, Kentucky, Illinois, Michigan, Minnesota, Nebraska, Wisconsin and South Dakota.

—The Illinois State Board of Registration in Medicine has been conducting a drive against illegal practitioners in Chicago and suburbs. Recently convicted was David Ingram, colored, who was given ninety days in the county jail. Ingram was involved in various swindles in Detroit, Waterbury, Conn., and Williamsport and Scranton, Pa. His aliases include the names William Hillis and Dr. William Hill. His claim to be a graduate of the National University of Argentina has been proved false. J. W. Keller pleaded guilty to practicing medicine without a license and was sentenced to eighty days in the county jail. Mrs. Ruth St. John pleaded guilty and was fined $100 and costs; a dietitian, she said she prescribed diets only for her friends. Similar fines were imposed on Mrs. Burd Gray, Oak Park, self-styled "herbalist," and Ray Drangle, operator of the "Dra-So Health Center." Mrs. Valerie Klinger, a "practical psychologist," was found guilty of violating the medical practice act, fined $100 and costs, and sentenced to thirty days in the county jail. Norman F. Allemeier was found guilty of practicing medicine without a license and fined $250 and costs. He was sentenced to sixty days in jail but was placed on probation pending good behavior. Mr. John J. Hallihan is director of the Illinois department of registration, and Mr. Homer J. Byrd, superintendent.

Deaths

THEODOR WILLIAM BERTHOLD, Chicago; Northwestern University Medical School, Chicago, 1922; a Fellow, A. M. A.; on the staff of the Little Company of Mary Hospital, Evergreen Park, Ill.; aged 43; died suddenly, October 5.

CHARLES BLIM, Crete, Ill.; Rush Medical College, Chicago, 1888; member of the Illinois State Medical Society; formerly secretary of the southern Cook County branch of the Chicago Medical Society; for many years a member of the school board; aged 77; died, October 9.

HAROLD IVAN A. COOKE, Chicago; Medical Department of the University of Alabama, Mobile, 1904; aged 61; died, September 30, of chronic myocarditis.

GEORGE HENRY COWLES, Woodhull, Ill.; Rush Medical College, Chicago, 1896; aged 65; died, September 29, of coronary disease while driving his automobile, which went over an embankment into the lake.

HOWARD CRUTCHER, Joliet, Ill.; Chicago Homeopathic Medical College, 1885; aged 70; died, September 11.

VICTOR MACKAY DALY, Pontiac, Ill.; University of Edinburgh Faculty of Medicine, Scotland, 1892; served during the World War; on the staff of St. James Hospital; aged 69; died, October 22, of heart disease.

ALBERT EUGENE FUCHS, Bunker Hill, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1912; a Fellow, A. M. A.; formerly a practitioner in Chicago; aged 61; died, October 27, of diabetes mellitus.

HENRY J. GAHAGAN, Chicago; Rush Medical College, Chicago, 1893; a Fellow, A. M. A.; practiced in Elgin, Ill., from 1897 to 1914, where he served as commissioner of health from 1897 to 1901, and city physician from 1901 to 1909; member of the American Psychiatric Association, member of its National War Work committee, 1917-1918, and chairman of its occupational therapy committee in 1918 and 1921; member of the medical house staff, attending physician, Elgin State Hospital, from 1893 to 1897, and superintendent from 1914 to 1917; medical director of the Mercyville Sanitarium, Aurora, since 1917; attending physician, consultant on the staff and member of the insanity committee of the Cook County Psychopathic Hospital; in 1916 was appointed by the board of administration of Illinois to visit the state institutions in New York, Pennsylvania, Maryland, Massachusetts and Ohio and report as to the industrial pursuits of patients; aged 68; was killed, November 10, when he was struck by an automobile as he alighted from a bus.

FREDERICK HARVEY, Chicago; Chicago College of Medicine and Surgery, 1915; a Fellow, A. M. A.; fellow of the American College of Surgeons; served during the World War; member of the attending staff of the Grant Hospital; aged 46; was killed, December 9, in an automobile accident.

THEODORE CALVIN HAYS, Canton, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1889; at one time professor of gynecology and obstetrics at his alma mater; past president of the school board and formerly city physician; served during the World War; on the staff of the Graham and Murphy Hospital; aged 71; died September 21, of pneumonia.

AUGUSTUS JOHN LEITZBACH, Fairmount, Ill.; Bellevue Hospital Medical College, New York, 1887; a Fellow, A. M. A.; aged 74; died, September 26, in the Lake View Hospital, Danville, Ill., of carcinoma of the prostate.

FINIS COLEMAN LITTLE, East St. Louis, Ill.; St. Louis University School of Medicine, 1906; a Fellow, A. M. A.; during the World War served on a draft board; formerly member of the board of fire and police commissioners; aged 64; died, October 13, in the Christian Welfare Hospital, of arteriosclerosis.

WILLIAM ALFRED MANN, SR., Chicago; Chicago Medical College, 1883; assistant clinical professor of ophthalmology and otolaryngology at his alma mater, 1903 to 1906; past president of the Evanston branch of the Chicago Medical Society; oculist and aurist to the Michael Reese Hospital dispensary, 1890-1899, and the Provident Hospital, 1899-1910; aged 77; died, October 8, at his home in Wilmette, Ill., of carcinoma of the colon.

GEORGE ALBERT MCLANE, Harvard, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1906; aged 60; died, October 2, of chronic nephritis.

HARRY COLLIER MIX, Oak Park, Ill.; Northwestern University Medical School, Chicago, 1909; served during the World War; aged 61; died, September 14, of cerebral hemorrhage.

JOHN HOWARD NEALL, Quincy, Ill.; Howard University College of Medicine, Washington, D. C., 1886; a Fellow, A. M. A.; aged 78; on the staff of Quincy Memorial Sanatorium, where he died October 13, of coronary occlusion.

ALFRED JAMES PARKER, Chicago; Chicago College of Medicine and Surgery, 1913; aged 62; died, October 6, of diabetes mellitus.

ELMORE SLOAN PETTYJOHN, Chicago; Rush Medical College, Chicago, 1882; aged 81; died, October 6 in Milford, Ohio.

JAMES THOMAS PICKERILL, Chicago; Northwestern University Medical School, Chicago, 1892; on the staff of the Swedish-Covenant Hospital; aged 71; died, October 14, of carcinoma of the submaxillary gland.

LEO ROBERT ROTH, Chicago; Illinois Medical College, Chicago, 1903; aged 56; died, September 22, in St. Anne's Hospital, of self-inflicted scalpel wounds.

CHARLES SCHOTT, Chicago; Rush Medical College, Chicago, 1909; a Fellow, A. M. A.; member of the American Academy of Pediatrics; served during the World War; on the staffs of the Illinois Masonic Hospital, St. Joseph's Hospital and the Children's Memorial Hospital; aged 51; died, October 1, of heart disease.

ELLIS SCHWIED, Chicago; Chicago College of Medicine and Surgery, 1914; on the staffs of the Mount Sinai Hospital and the Frances E. Willard Hospital; aged 46; died, November 27, of coronary thrombosis.

FRANK SEGEL SMITH, St. Peter, Ill.; Kentucky School of Medicine, Louisville, 1892; county coroner; aged 70; died, October 26, at Vandalia, of heart disease.

BORIS SOCOLOFF, Chicago; Loyola University School of Medicine, Chicago, 1919; aged 50; died, September 14, of heart disease.

CHARLES JOSEPH TIERNEY, Cicero, Ill.; Chicago College of Medicine and Surgery, 1915; a Fellow, A. M. A.; served during the World War; aged 48; on the staff of the Hospital of St. Anthony de Padua, Chicago, where he died, October 19, of coronary occlusion.

GEORGE A. WASH, Gibson City, Ill.; University of Louisville (Ky.) Medical Department, 1894; member of the Illinois State Medical Society; for ten years a member of the city board of health and board of education; past president and secretary of the Ford County Medical Society; member of the medical staffs of St. Joseph's and Mennonite hospitals, Bloomington; aged 68; died, September 21.